

The following Statement shows the several Routes followed by the Trade in the principal Staples of Traffic imported into Calcutta during the month of March 1880.

IMPORTS INTO CALCUTTA.

Specification of Routes.	FOOD-GRAINS.					FIBROUS PRODUCTS.		OILSEEDS.		Tea, Indian.	Cotton, raw.	Silk, raw.	SUGAR.	
	Rice.	Paddy.	Wheat.	Gram and pulses.	Other food- grains.	Jute, raw.	Gunny- bags.	Linseed.	Mustard seed.				Refined.	Unrefined.
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	No.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
By country boats ...	7,70,145	1,27,713	81,642	87,958	2,942	2,48,264	2,342,460	78,225	27,271	.....	2,989	182	8,451	82,8
" river steamers ...	5	.....	.....	.....	.....	78,530	.....	.....	2,534	9,153	65	36	.....	.....
" rail { East Indian ...	1,33,240	.....	2,12,310	73,686	8,307	.....	.....	1,05,820	206	1,62,751	546	.....	2,816	28,0
" Eastern Bengal ...	77,844	.....	34,243	20,553	2,890	75,827	25,2,059	22,274	44,307	2	.....	970	456	40,40
" road ...	96,358	11,334	3,308	17,422	.....	9,908	48,400	8,495	.....	.....	15	23	23,540	19,0
" sea ...	61,303	15,109	1	1,216	.....	114	4,170	1	628	158	14,750	139	4,728	19,0
Grand total of Imports { 1880 ...	11,38,884	1,54,156	3,31,504	2,00,835	14,119	4,12,643	2,647,698	2,75,581	1,78,560	9,519	1,80,570	1,806	39,991	1,31,6
in March ... { 1879 ...	8,77,272	1,76,638	92,495	1,56,939	16,234	4,60,877	2,482,264	1,39,320	1,83,601	8,858	1,50,230	1,371	25,112	.....

The following Statement shows the Quantities, Values, and Numbers of the principal Staples of Traffic exported inland from Calcutta during the month of March 1880.

EXPORTS FROM CALCUTTA.

Whither exported.	Cotton piece-goods (European).	Cotton twist (European).	Salt.	Gunny-bags.	Whither exported.	Cotton piece-goods (European).	Cotton twist (European).	Salt.	Gunny-bags.
BENGAL.	Rs.	Mds.	Mds.	No.	CHOTA NAGPORE.	Rs.	Mds.	Mds.	No.
Burdwan ...	3,14,562	1,477	42,630	40,141	Hazaribagh ...	80,720	24	2,530	40
Beerbhoom ...	91,600	484	8,614	48,825	Manbhum ...	79,520	410	3,301	12
Midnapore ...	8,950	1,067	1,150	8,670	Total of Chota Nagpore ...	1,60,240	443	5,840	62
Hooghly ...	74,981	80	6,817	37,133	Grand total of supplies into the provinces under the Lieutenant-Governor of Bengal. }	60,84,930	12,639	4,81,481	698,0
24-Pergunnahs ...	1,87,243	159	15,701	41,153	6	.....	.....	.....	.....
Nuddea ...	4,05,612	2,232	12,829	23,103	OTHER PROVINCES.	.....	.....	.....	.....
Jessore ...	21,000	420	23,019	.....	Assam ...	1,55,225	274	15,840	.....
Moorshedabad ...	1,84,780	113	8,380	24,460	North-Western Provinces ...	27,20,000	1,680	2,580	44,66
Dinapore ...	36,400	88	1,550	.....	Punjab ...	27,18,560	2,439	.....	15,62
Rajshahye ...	1,04,960	73	5,664	900	Central Provinces ...	94,480	217	.....	47,75
Ranipore ...	79,451	47	8,350	.....	Rajpootana States ...	98,000	49	.....	27,15
Bogra ...	84,720	91	1,150	.....	Bombay ...	19,096	23	.....	74,68
Pubna ...	85,280	307	34,376	2,008	Madras ...	1,95,271	1,097	.....	41,75
Julipgoree ...	50,240	122	6,100	.....	British Burmah ...	1,88,436	1,367	.....	1,37,38
Dacca ...	6,29,654	1,315	63,232	500	Nizam's territory ...	800	.....	.....	.....
Furreedpore ...	2,45,940	437	26,972	.....	Pondicherry ...	.....	.....	.....	.....
Backergunge ...	69,754	190	38,510	.....	Other places ...	2,24,071	104	11,407	3,56,5
Mymensingh ...	476	32	28,400	.....	Grand total of Exports { 1880 ...	1,24,98,869	19,889	5,11,308	7,81,5
Tipperah ...	1,11,061	175	7,400	18,000	in March ... { 1879 ...	1,27,49,595	23,568	4,33,226	6,72,5
Chittagong ...	29,190	170	5,500	.....	.....	.....	.....	.....	.....
Noakhally ...	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total of Bengal ...	28,15,854	9,079	3,46,344	246,893	.....	.....	.....	.....	.....
BEHAR.	Rs.	Mds.	Mds.	No.	.....	.....	.....	.....	.....
Patna ...	12,66,720	406	55,627	228,045	.....	.....	.....	.....	.....
Shahabad ...	2,81,440	11	17,243	20,195	.....	.....	.....	.....	.....
Mozafferpore ...	3,88,640	6	4,007	3,605	.....	.....	.....	.....	.....
Durbhunga ...	3,03,920	547	15,682	19,005	.....	.....	.....	.....	.....
Saran ...	2,00,720	.....	8,038	34,120	.....	.....	.....	.....	.....
Monchyr ...	2,08,340	140	13,245	34,315	.....	.....	.....	.....	.....
Bhadulpore ...	1,06,560	188	2,800	970	.....	.....	.....	.....	.....
Purneah ...	.....	.....	2,350	800	.....	.....	.....	.....	.....
Maldah ...	2,07,520	205	10,305	41,685	.....	.....	.....	.....	.....
Total of Behar ...	30,23,860	1,691	1,29,297	389,752	.....	.....	.....	.....	.....
ORISSA.	Rs.	Mds.	Mds.	No.	.....	.....	.....	.....	.....
Cuttack ...	71,620	1,326	.....	8,700	.....	.....	.....	.....	.....
Pooree ...	13,356	100	.....	4,000	.....	.....	.....	.....	.....
Balasore ...	.....	.....	.....	42,125	.....	.....	.....	.....	.....
Total of Orissa ...	84,976	1,426	.....	54,825	.....	.....	.....	.....	.....

The Sea-borne Trade of Calcutta in these staples during the month of March was as follows:-

IMPORTED INTO CALCUTTA-	Rs.*	Mds.	Mds.	No.
From Foreign Ports-	.....	.....	.....	.....
United Kingdom ...	94,34,743	12,340	.....	.....
Other Foreign ports ...	8,84,932	241	5,19,285	15
Total of Foreign trade ...	1,03,19,675	12,581	5,19,285	15
From Indian Ports-	.....	.....	.....	.....
Bombay ...	11,671	.....	40,475	.....
Madras ...	4,002	143	.....	.....
Other ports in Madras ...	500	.....	.....	.....
British Burmah ...	11,859	22	.....	.....
Other Indian ports ...	.....	.....	.....	.....
Total of Interportal trade ...	28,032	165	40,475	15
Grand total of Imports { 1880 ...	1,03,47,707	12,746	5,59,760	15
in March ... { 1879 ...	59,18,562	6,342	5,64,978	40

The following Statement shows the several Routes followed by the Trade in the principal Staples of Traffic exported from Calcutta during the month of March 1880.

SPECIFICATION OF ROUTES.					Cotton piece-goods (European).	Cotton twist (European).	Salt.	Gunny-bags.
By country boats ...	.....	.....	.....	.....	Rs.	Mds.	Mds.	No.
" river steamers ...	.....	.....	.....	.....	1,10,138	2,655	2,63,984	16,62
" rail { East Indian ...	.....	.....	.....	.....	2,58,090	803	2,990	.....
" Eastern Bengal ...	.....	.....	.....	.....	96,24,950	8,656	1,88,895	1,132,56
" road ...	.....	.....	.....	.....	16,68,000	3,700	49,084	.....
" sea ...	.....	.....	.....	.....	2,33,960	.....	6,395	9,40
Grand total of Exports in March ... { 1880 ...	1,24,98,869	19,889	5,11,308	7,81,5				
{ 1879 ...	1,27,49,595	23,568	4,33,226	6,72,5				

* As per tariff declaration value.

Results of the Meteorological Observations taken at the Alipore Observatory from
30th May to 5th June 1880.

Month.	Date.	Maximum in suns.	Mean pressure barometer at 32° Fahr.	TEMPERATURE.				HYGROMETRY.				WIND.			Rain.	WEATHER.
				Mean.	Maximum.	Range.	Minimum.	Mean wet bulb.	Vapour tension.	Dew point.	Humidity.	Prevailing direction.	Miles recorded.			
1880. May	30th	154°0	Inches. 29·516	83°7	93°6	15°4	78°2	79°5	0·951	77·7	83	Till 4 A.M. S W, till 8 A.M. S, till 2 P.M. chiefly E by N through S E, till midnight S S E through S E.	114	Inches Nil	Cloudy, g d t.	
"	31st	149°1	527	83°4	90°7	11°5	79°2	77·1	851	74·4	75	Till 5-45 A.M. S S E, till 1-15 P.M. E S E, till 6 P.M. W N W through S, S W, and W, till midnight N.	63	0·07	Cloudy, o g d t.	
June	1st	150°5	540	83°1	90°5	11°2	79·3	74·0	718	69·3	64	Till 4-45 A.M. N, till 10 P.M. chiefly E S E through N E and E, till midnight E.	160	0·07	Cloudy o g d.	
"	2nd	91°6	442	79°8	81°9	3°7	78·2	76·0	852	74·4	84	Chiefly E & E by N.	205	0·94*	Cloudy, o g d p.	
"	3rd	120°7	372	81°4	83·7	5·7	78·0	78·9	955	77·8	80	Till 3-30 A.M. E S E, till midnight chiefly S W through S E & S.	248	0·49†	Cloudy, o g d p.	
"	4th	121°7	480	81°4	87·3	8·5	78·8	76·2	840	74·0	78	Chiefly S W & S W by S.	261	1·57	Cloudy, o g d p t l	
"	5th	125°7	504	82·9	88·1	13·7	74·4	75·2	774	71·5	69	Till 3 A.M. S S W, till 10 A.M. S, till midnight chiefly S W.	194	0·63‡	Cloudy, o g.	

* 0·30 fell since 7-10 P.M. of the 1st.

† 0·19 fell since 7-20 P.M. of the 2nd.

‡ Fell since 5-40 P.M. of the 4th instant.

Inches.

The mean pressure of the seven days	...	...	...	29·483
The average pressure of the corresponding period for 24 years, S. G. Office	...	...	...	29·582
The mean temperature of the seven days	...	...	...	82·2
The average temperature of the corresponding period for 24 years, S. G. Office	...	...	...	86·6
The extreme variation of temperature during the seven days	...	...	...	19·2
The maximum temperature during the seven days	...	...	...	93·6
The highest velocity of the wind in one hour during the seven days	...	...	...	Miles. 18
The highest pressure of the wind on one square foot during the seven days	...	...	...	ms. 6
The mean relative humidity during the seven days	...	...	...	77
The average relative humidity of the corresponding period for 24 years, S. G. Office	...	...	...	76
The total fall of rain from 30th May to 5th June 1880	...	...	...	Inches. 3·77
The average fall of the corresponding period for 24 years, S. G. Office	...	...	...	13·98
The total fall from 1st January to 5th June 1880	...	...	...	1·58
The average fall of the corresponding period for 24 years, S. G. Office	...	...	...	10·78

The mean pressure, temperature, &c., are deduced from the traces of the barograph and thermograph.
The maximum and minimum temperatures are obtained from self-registering thermometers. All the
thermometers are verified, and the readings have been corrected to a standard constructed and verified
at the Kew Observatory. They are exposed under a thatched shed open at the sides, and are suspended four
feet above the ground.

The barometer readings are corrected approximately to those of the standard Newman's No. 86,
formerly at the Surveyor-General's Office.

The hygrometric elements are obtained from Tables III, IV, and V of the official tables computed in the
Meteorological Office, and based on Regnault's modifications of August's formula.

The direction and movement of the wind are taken from the trace of a Beckley's anemograph.

The mouth of the rain-gauge is one foot above the ground.

o overcast, g gloomy, d drizzling, t thunder, l lightning, p passing showers.

METEOROLOGICAL OFFICE, INDIA,
The 7th June 1880.

JOHN ELIOT,
For Meteorological Reporter to the Government of India.

Abstract of the results of Meteorological Observations taken at Alipore Observatory in the month of May 1880.

		Inches.	Date.	Hour.
The mean pressure of the month	...	29.670		
The average pressure of 24 years	...	29.656		
The highest pressure during the month	...	29.826	6th	10h.
The lowest pressure during the month	...	29.470	28th	16h.
The range of pressure during the month	...	0.356		
○				
The mean temperature during the month	...	83.6		
The average temperature of 24 years	...	86.1		
The highest temperature during the month	...	95.8	21st & 27th	
The lowest temperature during the month	...	69.8	5th	
The range of temperature during the month	...	26.0		
The mean daily range of temperature during the month	...	16.8		
The greatest range of temperature in one day during the month	...	21.8	2nd	
%				
The mean humidity during the month	...	76		
The average humidity of 24 years	...	78		
Inches.				
The mean vapour tension during the month	...	0.869		
The average vapour tension of 24 years	...	0.933		
The mean cloud proportion of the month	...	5.21		
Inches.				
The total rainfall of the month	...	4.87		
The average fall of 24 years	...	5.40		
The greatest fall in 24 hours	...	1.41	10th	
Days.				
The number of rainy days in the month	...	12		
The average number of rainy days of 24 years	...	13		
○				
The mean maximum equilibrium temperature of solar radiation of the month	...	151.6		
The mean difference of sun and air temperatures	...	59.0		
The greatest sun temperature	...	156.7	15th	
The greatest excess of sun over air temperature	...	64.2	15th	
The mean temperature of nocturnal radiation thermometer on woollen cloth	...	72.1		
The mean depression of nocturnal radiation thermometer below the minimum of air	...	3.8		
The greatest depression of nocturnal radiation thermometer below the minimum of air	...	6.6	18th	
Miles.				
The mean movement of the wind per day	...	135.4		
The greatest movement of the wind in one day	...	204.0	5th	
The greatest movement of the wind in one hour	...	22.0	4th 4 to 5 p.m.	
The number of hours under each of the 8 points				

N 22, NE 33, E 77, SE 126, S 156, SW 252, W 48, NW 22, Calm 8.

The results of observations at the Alipore Observatory are not rigorously comparable with the registers of past years (at the Park Street Observatory). The barometer is about 3 feet higher at Alipore, and other things being equal, reads therefore .003 lower. The diurnal range of temperature is also greater at Alipore, and the mean temperature apparently about 2.70 lower; and finally, the thermometer, which has furnished the record of temperature at the Surveyor-General's Office during the last 20 years and upwards, is found to read 0.6 higher than the Kew standard thermometer, which is the standard of reference at the present Observatory.

JOHN ELIOT,

For Meteorological Reporter to the Govt. of India.

METEOROLOGICAL OFFICE, INDIA, the 7th May 1880.

Report of Fluctuation of Traffic on the East Indian Railway for
the month ending 24th April 1880.

EAST INDIAN RAILWAY, TRAFFIC MANAGER'S OFFICE, JAMALPORE, THE 29TH MAY 1880.

Remarks on Traffic of East Indian Railway for the month ending 24th April 1880.

THE approximate figures for the period are as follow :—

	Coaching.		Goods.		Total.
	No.	Rs.	Mds.	Rs.	Rs.
1880	647,485	9,11,238	55,80,477	25,86,818	32,98,056
1879	675,771	9,87,685	60,74,149	27,56,966	37,44,551
Increase	26,286	70,447	4,93,672	3,70,048	4,46,495
Decrease					

The statement given below will explain the decrease in the coaching traffic :—

Decreases at

Stations.	No.	Rs.	Causes.
Boidynath	1,400	3,400	Pilgrims.
Futwah	2,300	8,400	Opening of Gya line taking away outward passengers.
Benares	6,000	16,900	Gya, Bindachal pilgrims last year, sickness and hot weather.
Mirzapore	500	600	Bindachal mela last year.
Nynee	2,500	8,600	Bathing festival and other pilgrims to Bankipore, Benares, and Jubbulpore.
Allahabad	3,300	3,900	3rd class passengers and luggage.
Cawnpore	3,100	5,100	Hindoo pilgrims to Agra, Hattras, Muttra, and Delhi.
Etawah	200	1,000	Hurdwar mela last year.
Agra	3,100	7,700	Ditto ditto.
Allyghur	3,500	2,600	Ditto ditto.
Gazeenabad	9,600	17,800	Ditto ditto.
Bankipore		2,700	For Gya pilgrims last year.
Nulhati	1,000	2,400	For ditto ditto, and through passengers.
Total	36,500	80,600	

Troop extra trains.

Decrease of Rs. 6,600.

The goods traffic shows a falling off during the period of 8 per cent in weight and 13½ per cent in earnings. The approximate decrease in earnings is Rs. 3,70,000, and in two items alone this sum has been more than lost, viz.—

	Rs.
Cotton	2,61,640
Seeds	1,82,020
Total	4,43,600

With regard to cotton, my last monthly report pointed out the slender hopes held of a continuance of the traffic in this staple. The Calcutta market is described as dull and depressed, stocks largely in excess of demand, news from Europe unsatisfactory, and a reduction of 8 per cent in the quoted value.

We have during the 12 months ending 1879 done well in cotton; but with prices so low in Calcutta, we must expect the decrease to continue.

Seeds.—This traffic has fallen off considerably during the period, this month's figures showing a decrease of 2,87,080 maunds and Rs. 1,82,000 compared with last year. The reason seems to be the very low prices in the Calcutta markets, and the rise in freights preventing sellers from doing any large business.

A table giving the freights from Calcutta to London and to America respectively by steamer and sailing ship, and the value of linseed per bazar maund in Calcutta for each fortnight from 24th February to 4th May current, is appended.

This will show the rise of freight and fall in value of this seed distinctly.

For purposes of comparison, I have also shewn similar information for 1879 with regard to linseed only.

LINSEED FREIGHTS TO LONDON.

VIA CANAL.

Steamers.

	24/2	9/3	23/3	7/4	20/4	4/5
1880	£ 3 0 0	3 0 0	2 15 0	3 2 6	3 0 0	3 2 6
1879	" 1 15 0	2 0 0	2 0 0	1 15 0	1 17 6	2 0 0

VIA CAPE.

Ships.

	24/2	9/3	23/3	7/4	20/4	4/5
1880	£ 2 0 0	2 0 0	2 7 6	2 12 6	2 12 6	2 12 6
1879	" 1 7 6	1 12 6	1 15 0	1 10 0	1 12 6	1 12 6

AMERICA.

	24/2	9/3	23/3	7/4	20/4	4/5
1880	£ 7 18	7 18	9 18	9 18	9 18	9 18
1879	" 4 18	5 5	5 5	5 5	5 5	5 5

Value.

	24/2	9/3	23/3	7/4	20/4	4/5
1880 L small	Rs. 5 2 0	4 9 0	4 9 0	4 5 0	4 5 0	4 5 0
1879	" 4 9 0	4 11 0	4 12 0	4 10 0	4 11 0	4 10 6

The following table shows the total seed traffic carried over the whole line, month, by month for 1879, 1879, and 1880.

It will be seen that we are much lower this year, but this cannot be attributed to any failure in the crops, as they are known to have been abundant. The decrease is chiefly at Cawnpore, where despatches fell off to the extent of 2,60,770 maunds and Rs. 1,40,760, and I am informed that prices there are from 2 to 2½ annas per maund higher than in Calcutta.

Seed Traffic.

	1878.		1879.		1880.	
	Mds.	Rs.	Mds.	Rs.	Mds.	Rs.
January	5,94,993	2,50,792	4,60,895	1,82,220	4,80,002	1,70,232
February	5,35,166	2,33,608	4,09,427	1,49,662	5,28,192	2,27,162
March	7,65,727	3,07,631	5,79,236	2,29,182	6,94,262	2,75,644
April	12,82,132	5,54,635	9,97,348	4,86,402	7,10,270	3,04,380
May to 15th	6,60,693	2,97,967	5,29,236	2,58,761	3,65,836	1,58,511
Total	.....	16,44,513	.....	13,06,236	.....	11,35,929

In other staples the principal fluctuations are made out thus—

Increases.

Coal,	Piece-goods,
Hides and Horns	Sugar.

Decreases.

Grain,	Railway material, Foreign,
Salt,	

and the following remarks will explain how they arise :—

Coal, Up	... ... ...	... ...	Mds.	49,710	Rs.	22,490
," Down	... ... ...	... ...	"	89,190	"	13,330
			Total	1,38,900		35,820

The upwards traffic in coal is very steady, and if the coal carried for Jubbulpore line last year be deducted from the earnings as is now done, the increase would have been larger.

In downwards coal we are not receiving any unusual orders, but the traffic is continuous, as a glance at the weight carried will show. It must be borne in mind that the despatches at the collieries are controlled by the very limited unloading room and primitive appliances at Howrah.

Hides	Mds.	19,780	Rs.	17,930
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Prices in Calcutta are still high and hides in much request, but supplies are not large enough to meet demands.

Piece-goods	Mds.	18,700	Rs.	44,910
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A steadier business was developed in Calcutta in the early part of April, owing to better demand from up-country, there being taken advantage of at once and the heavy supplies sent thither will account for the increase. Stocks up-country are now large, and we shall probably see a falling off next month.

Sugar	Mds.	48,570	Rs.	27,310
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Increase chiefly at Howrah, Zemaneah, and Cawnpore, which stations despatched more to Sind, Punjab and Delhi Railway this year.

*Decreases.**Grain—*

The items under this head come out as follows for the month—

	Increase.		Decrease.	
	Mds.	Rs.	Mds.	Rs.
Oats	...	20	60	....
Rice	...	8,470	....	....
Wheat	1,10,470	95,350	....	....
Other grains	1,15,030	....	3,12,550	1,15,550
Pulses	....	....	35,470	16,800
Total	2,25,500	1,03,840	3,48,080	1,32,350
Net decrease	....	....	1,22,580	28,510

The small increase in rice is only a fluctuation, the stocks of this article in the country are very large, but there being no special demand anywhere, I do not anticipate any great improvement in this traffic.

The wheat traffic has improved to some extent, and this has resulted from the wheat in Oudh and the North-West being in demand.

The traffic *via* Cawnpore has increased 63,400 maunds, while that *via* Allyghur has fallen off 16,500 maunds. At the same time wheat from our Allyghur station has increased 34,400 maunds.

In other grains and pulses we must expect a decrease, seeing that the bountiful crops throughout India this season have more than sufficed for consumption in all provinces and stopped special demands.

Railway material, Foreign	Mds.	1,05,720	Rs.	86,010
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Last year we were despatching materials from Howrah for the Gya State Line; also sleepers for the Rajpootana State Railway. This year the demand for carriage has been limited.

Salt	Mds.	85,620	Rs.	8,060
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This decrease is chiefly in salt *via* Agra and *via* Delhi to Oudh and Rohilkund.

This is probably only a fluctuation, the previous months having shown large increases, and doubtless flooded the markets.

The train mileage for the period has been—

	Coaching.		Goods.		Total.	
	Nos.	Rs.	Nos.	Rs.	Rs.	Rs.
1880	191,349	4,45,431	6,36,780			
1879	210,146	5,00,970	7,11,116			
Increase	18,797	55,539	74,336			
Decrease	....	....	....	....	....	....
Earnings per train mile—						
	Coaching.	Goods.		Totals.		
	Rs. A. P.	Rs. A. P.		Rs. A. P.		
1880	4 12 2	5 5 9		5 2 10		
1879	4 11 12	5 8 1		5 4 3		
Increase	0 1 0	0 2 4		0 1 5		
Decrease	....	....	....	....	....	....

The large decrease in cotton will account for the falling off in the earnings per train mile.

There is an increase in the shunting mileage of 931 hours, which is attributable chiefly to the increased work at Giridi coal fields.

EAST INDIAN RAILWAY.

*Statement showing the Totals and Increases and Decreases of Staples during four weeks
ending 24th April 1880.*

STAPLES.	WEIGHT.		AMOUNT.		1880.			
	1879.		1880.		1879.		1880.	
	Mds.	Mds.	Rs.	Rs.	Mds.	Rs.	Mds.	Rs.
Beer, Commissariat	4,600	1,600	3,080	620	.....	.....	2,310	2,460
" not Commissariat	4,380	4,010	5,590	5,050	.....	.....	370	540
Betel-nuts and leaves	10,970	11,920	10,000	15,750	950	3,750	.....	.....
Boots and shoes	1,650	1,710	2,510	2,580	60	70	.....	.....
Brass and brassware	14,840	13,500	15,010	11,410	.....	.....	1,540	1,600
Bricks	3,600	3,500	1,490	1,060	.....	.....	190	450
Coal, up	3,07,440	3,57,150	1,58,100	1,80,500	49,710	22,490	.....	.....
" down	13,77,350	14,06,540	2,11,120	2,24,450	89,190	15,330	.....	.....
Copper	8,750	9,300	10,780	13,310	550	2,430	.....	.....
Cotton	2,24,380	70,880	3,61,340	99,700	.....	.....	1,53,500	2,61,640
" twist	11,100	16,100	13,650	12,180	.....	.....	1,900	1,490
Dyewood	7,740	9,460	6,560	8,730	1,720	2,170	.....	.....
Empty coops, &c.	4,160	4,450	1,940	2,030	290	90	.....	.....
Firewood	25,820	7,070	1,950	1,470	.....	.....	18,750	450
Fruits	14,750	13,950	7,120	6,750	.....	.....	800	370
Glassware	4,370	3,630	4,830	4,600	.....	.....	740	230
Ghee and oil	19,980	21,790	17,960	24,370	1,810	6,910	.....	.....
G. B. T. packages	2,800	3,730	6,480	9,180	930	2,700	.....	.....
Government Commissariat stores	12,410	14,730	13,840	22,720	2,320	8,880	.....	.....
Ordnance stores	12,330	12,590	25,710	23,670	260	.....	.....	40
Barley	6,470	5,850	2,610	2,450	.....	.....	620	130
Oats	13,910	13,850	4,130	4,150	20	60	.....	.....
RICE	2,99,770	4,10,240	64,480	72,550	1,10,470	8,470	.....	.....
GRAINS, EDIBLE, & PULSES.	3,28,390	4,43,420	1,07,540	2,02,890	1,15,930	95,350	.....	.....
Wheat	1,32,400	1,32,400	1,36,280	29,730	.....	.....	3,12,550	1,15,550
Other grains	1,32,290	96,820	43,890	27,060	.....	.....	35,470	16,890
Pulses of all kinds	59,850	58,650	41,720	39,330	.....	.....	1,200	2,320
Gunny	55,680	75,460	43,240	61,170	19,780	17,930	.....	.....
Hides and horns	360	340	360	320	.....	.....	20	40
Indigo	48,550	45,440	49,500	55,130	.....	5,630	3,110	.....
Iron	1,59,220	91,980	36,810	30,520	.....	.....	66,340	6,220
Jaggree	12,640	10,600	10,550	10,950	.....	.....	2,040	500
Lac	45,560	41,050	10,810	10,490	.....	.....	4,310	320
Minerals	18,540	14,580	3,190	2,480	.....	.....	3,760	710
Mowah flower	10,360	12,510	2,210	2,830	2,150	620	.....	.....
Oil-cake	5,380	20,870	4,320	12,590	15,490	8,270	.....	.....
Opium	4,860	7,020	7,030	10,040	2,180	3,010	.....	.....
Paper	2,90,700	2,14,400	2,43,340	2,88,250	12,700	44,910	.....	.....
Piece-goods	13,020	13,310	780	3,870	250	3,090	.....	.....
Railway materials, construction account	1,55,300	40,580	1,45,400	59,390	.....	.....	1,05,720	85,910
foreign	11,750	18,960	4,500	5,240	7,210	740	.....	.....
Roots	3,83,760	2,98,140	98,620	96,560	.....	.....	88,620	8,960
Salt	65,900	58,210	30,830	29,360	.....	.....	7,690	1,470
Saltpetre	9,97,350	7,10,270	4,86,400	3,04,380	.....	.....	2,87,080	1,82,030
Seeds	1,940	1,780	3,030	2,830	.....	.....	160	200
Silk	5,550	6,150	7,480	8,210	560	730	.....	.....
Spelter	14,830	15,910	16,840	16,630	1,080	.....	.....	210
Spices	47,010	62,930	9,450	10,510	15,920	1,080	.....	.....
Stones	2,25,240	2,73,810	84,370	1,11,680	48,570	27,310	.....	.....
Sugar	2,780	4,280	5,070	5,600	1,500	530	.....	.....
Tea	40,020	29,270	8,770	8,840	70	10,750	.....	.....
Timber	48,910	56,480	40,270	42,070	8,470	2,490	.....	.....
Tobacco	9,390	13,830	6,520	10,340	4,440	3,820	.....	.....
Turmeric	5,590	6,940	12,100	12,930	1,350	830	.....	.....
Wines	1,48,830	1,37,740	1,71,020	1,90,060	.....	19,040	11,090	.....
Miscellaneous	Total	60,96,500	54,95,770	28,20,470	24,37,160	5,15,960	3,05,670	11,18,320
								8,89,330

URBAN BROUGHTON, Offy. Traffic Manager.

Weekly Return of Traffic Receipts on Indian Railways.

EAST INDIAN RAILWAY.

Approximate Return of Traffic for week ended 29th May 1880 on 1,507½ miles open.

	COACHING TRAFFIC.			MERCHANTAND AND MINERAL TRAFFIC.			TOTAL TRAFFIC RECEIPTS.	TRAIN MILES RUN.		
	No. of passengers.	Coaching receipts.	Weight carried.	Receipts.	Coaching.	Merchandise.		Coaching.	Merchandise.	Total.
Total traffic for the week ...		Rs. A. P.	£ s. d.	Mds. s.	Rs. A. P.	£ s. d.	Rs. A. P.	37,738	107,682	145,420
Or per mile of railway ...	163,273	1,82,597 12 9	16,738 2 8	13,10,246 20	5,26,327 7 3	48,246 13 7	7,08,925 4 6	.....	.....	.....
For previous 20 weeks of half-year ...	.....	121 2 4	11 2 1	.....	349 3 2	32 0 3	470 5 6	.....	.....	.....
Total for 21 weeks ...	3,369,109	47,11,039 8 0	431,845 5 9	3,00,03,393 0	1,27,08,630 15 8	1,164,957 16 16	1,74,10,070 7 8	991,888 1	2,271,767 1	3,263,655 1
Total for 21 weeks ...	3,472,382	48,93,637 4 9	448,583 8 5	3,18,18,639 20	1,32,34,958 6 11	1,213,364 19 6	1,81,28,595 11 8	1,029,626 1	2,370,449 1	3,409,075 1
COMPARISON.										
Total for corresponding week of previous year ...	166,068	1,92,488 13 3	17,644 16 2	16,81,520 20	7,00,726 11 9	64,233 5 8	8,93,315 9 0	51,727	138,720	190,447
Per mile of railway, corresponding week of previous year ...	.....	127 11 4	11 14 1	.....	464 14 6	42 12 4	592 9 10	.....	.....	.....
Total to corresponding date of previous year ...	3,510,184	50,69,174 1 6	464,674 5 11	3,42,70,637 30	1,43,36,417 13 10	1,314,171 12 9	1,94,05,591 15 4	1,137,269	2,707,985	3,845,254

EASTERN BENGAL RAILWAY.

Approximate Return of Traffic for week ended 29th May 1880 on 171½ miles open.

	COACHING TRAFFIC.			MERCHANTAND AND MINERAL TRAFFIC.			Total receipts.
	Number of passengers.	Coaching receipts.	Weight carried.	Receipts.	Coaching.	Merchandise.	
Total traffic for the week ...	45,502	Rs. A. P.	£ s. d.	Mds. s.	Rs. A. P.	£ s. d.	£ s. d.
Or per mile of railway ...	265	25,551 0 0	2,342 5 6	3,85,500 0	34,610 1 0	3,172 11 8	5,514 15 2
For previous 21 weeks of half-year ...	850,657 1	148 12 4	18 12 8	1,080 2	201 8 3	18 9 6	32 2 2
Total for 22 weeks ...	896,159 1	6,79,137 6 2	62,254 5 4	40,92,399 35	7,37,707 7 10	67,623 3 7	129,877 8 11
COMPARISON.							
Total for corresponding week of previous year ...	45,719 1	33,722 15 4	3,091 5 5	2,19,537 30	40,564 14 10	3,718 9 1	6,809 14 6
Per mile of railway, corresponding week of previous year ...	266	196 5 7	18 0 0	1,278 10	236 3 0	21 13 0	39 13 0
Total to corresponding date of previous year ...	904,535	7,15,378 3 7	65,622 3 4	35,65,922 6	6,72,793 10 5	61,672 15 1	127,294 18 5

BENGAL PROVINCIAL RAILWAYS.

Weekly Statement of Traffic Receipts.

No. 16.

Latest return received.	Name of Railway.	Length open.	RECEIPTS FOR WEEK ENDING		TOTAL RECEIPTS FROM 1ST JANUARY		Total increase in 1880.	Total decrease in 1880.
			26th April 1879.	24th April 1880.	To 26th April 1879.	To 24th April 1880.		
1880.		Miles.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
24th April ...	Northern Bengal ...	236	20,698 0 0	26,482 0 0	3,40,240 0 0	4,67,839 0 0	1,27,599 0 0	.....
24th inst ...	Tirhoot ...	82	8,873 0 0	10,044 0 0	1,63,298 0 0	1,78,253 0 0	14,355 0 0	.....
15th May ...	Calcutta and South-Eastern ...	28	2,570 0 0	2,125 0 0	45,479 0 0	43,764 0 0	.....	1,718 0 0
24th April ...	Nalhati ...	27 1	1,578 0 0	1,257 0 0	29,942 0 0	26,326 0 0	.....	3,616 0 0
24th do ...	Patna and Gya ...	57	1,540 0 0	13,382 0 0	1,549 0 0	1,53,504 0 0	1,51,955 0 0	.....
	Total ...	424	35,558 0 0	53,290 0 0	5,80,508 0 0	8,69,686 0 0	2,94,509 0 0	5,331 0 0



SUPPLEMENT TO The Calcutta Gazette.

WEDNESDAY, JUNE 16, 1880.

OFFICIAL PAPERS.

Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on payment of Six Rupees per annum if delivered in Calcutta, or Twelve Rupees if sent by Post.

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ANNUAL REPORT ON THE POLICE ADMINISTRATION OF THE TOWN OF CALCUTTA AND THE SUBURBS.

POLICE.

Dated Calcutta, the 10th June 1880.

RESOLUTION.

READ—

The Annual Report on the Police Administration of the Town of Calcutta and its Suburbs for 1879.

Read also—

The Annual Reports of the Chief Presidency Magistrate and the Presidency Magistrate of the Northern Division on the Criminal Administration of their courts for the year 1879.

Read again—

The Reports for 1878, and the orders of Government recorded thereon.

The returns for the past year show a decrease of 4,174 in the total number of cases reported in the town and suburbs, there being a decrease of 4,846 cases in the town, and an increase of 672 cases in the suburbs. The following statement shows the number of cognizable and non-cognizable cases in the town and suburbs together for the past three years:—

		1877.	1878.	1879.
Cognizable	{ Penal Code	6,260	6,192	5,537
	{ Miscellaneous	13,266	18,074	13,112
Non-cognizable	{ Penal Code	6,759	8,233	7,843
	{ Miscellaneous	18,301	13,308	15,141
	Total	<hr/> 44,586	<hr/> 45,807	<hr/> 41,633

These figures show a decrease in the number of cognizable offences under the Penal Code as compared with the returns of the previous two years, and a decrease of 4,962 in the number of miscellaneous cognizable offences as compared with the returns of 1878. The number of these offences, most of which are committed on the public streets, was unusually high in 1878, and the great reduction in the past year merely represents that the cases have fallen to approximately their average annual number. Out of 42,305 persons arrested or summoned during the year, 33,722 or 80 per cent were convicted, as compared with 79 per cent in the previous year; of 5,472 persons arrested in cognizable cases under the Penal Code, 3,490 or 64 per cent were convicted, against 68 per cent in 1878. Compared with 1878, convictions in the town for serious offences against the person rose from 207 to 237, or from 74.72 per cent to 75.23; and for serious offences against both person and property from 70.19 to 78.03. Notwithstanding an increase in the number of cases in the suburbs, the number of false cases fell from 87 in 1878 to 57 in 1879; but, on the other hand, although there was a decrease in the town of nearly five thousand cases, the false cases rose from 746 to 854. It is explained that the returns of false cases include complaints made through mistake of fact, as well as those made through malice; but the falling off is not, on this account, less a matter for regret. It is but a slight consolation to a man, who is accused of a crime that he has not committed, and is subjected to the inconvenience and disgrace of a police investigation, to know that his accuser was only careless and hasty, and not malicious. It is satisfactory to know that in the case that was probably the worst of all the false cases in the year, the complainant was deservedly punished. In this case a boatman charged three other boatmen with murdering one of his own crew, whom he had himself secreted in a house in the town. In only 46 out of the 854 false cases in the town was compensation awarded to the persons falsely charged. The total amount of property stolen in the town and suburbs was Rs. 1,11,294, of which Rs. 71,061 was recovered, the percentage of property recovered being higher than in any previous year. There were 709 convictions of Europeans and Eurasians under the Penal Code, against 884 in the previous year, the decrease being chiefly in convictions for minor offences, such as petty assault and local nuisances. The Chief Presidency Magistrate reports that there has also in recent years been a marked and steady decrease in the number of cases of stabbing by seamen in drunken riots.

2. *Town.*—The number of true cognizable cases in the town was 14,511, against 19,695 in 1878 and 15,185 in 1877. There was a slight increase in the number of offences against the State; in serious offences against the person, and against person and property; and in minor offences against the person. In minor offences against person and property there was a decrease of 244 cases, and in other miscellaneous offences under the Penal Code and special and local laws there was a decrease of 5,024 cases as compared with the returns of 1878. The decrease was principally in prosecutions under the Stage Carriage Act, for nuisances, for offences in the public streets, and for cruelty to animals. Four cases of murder were reported in 1879, against five in 1878. In two out of the four cases the prisoners were convicted, and the capital sentence was carried out; in the third case the prisoner was convicted of culpable homicide not amounting to murder; and in the fourth case a search was still being made for one of the murderers when the Commissioner's report was submitted. In three out of the four cases the victims were women, who were killed by their paramours. Of the two cases of attempt at murder, one was committed by a Hindoo on his mistress, and the other was the case in which a Eurasian lunatic fired at the Viceroy's carriages on His Excellency's return to Calcutta in December last. Besides the case already mentioned, in which the jury found one of the prisoners charged with murder guilty of culpable homicide not amounting to murder, there were two other cases of the latter offence. In one of these cases an East Indian killed his wife, and wounded himself so severely that he died before he could be brought to trial; the other case was that in which a seaman of the American Barque *C. O. Whitmore* was convicted of killing the chief mate on the high seas. There were 20 cases of grievous hurt, against 28 in the previous year, and 56 cases of hurt by dangerous weapons, against 31 in 1878 and an average of ten cases in the previous five years. The class of crime last-named appears to have increased very much

of late, but judging from the sentences inflicted in those cases in which convictions were obtained, the offences cannot have been so serious as the name would imply. Out of 67 persons who were convicted of causing hurt by dangerous weapons, only four were sentenced to more than three months' imprisonment. There were 136 true cases of burglary and lurking house-trespass, against 115 in 1878 and 78 in 1877; the cases detected were 79, against 56 and 41 respectively in 1878 and 1877, and the convictions were 104, against 73 and 41. The proportions of cases detected and convictions to the total number of true cases were higher than in either of the preceding two years, and the percentage of stolen property recovered was unusually high, Rs. 10,196 being recovered out of Rs. 12,232 reported as stolen. The number of thefts fell from 2,231 in 1878 to 1,979, and 1,051 of the cases were detected; in only 271 cases was the value of the property stolen above Rs. 50. A large proportion of the thefts from houses were as usual committed by servants, and there were far more cases in the division containing the houses of the leading merchants than elsewhere. The working of the River Police in theft cases was particularly successful, 193 persons being convicted in 183 cases; in 155 of the cases the whole or a portion of the stolen property was recovered, the total recoveries being 76 per cent of the amount stolen. There were 337 cases of criminal breach of trust and 297 convictions, against 321 cases and 249 convictions in 1878, and an average of 180 cases in each of the five years preceding 1878. Thefts by carriers engaged at the Howrah Railway Station are reported to be still carried on systematically, and the carters now brand their carts with figures in imitation of the official registration marks which were adopted in order to put a stop to the thefts.

3. In prosecutions for miscellaneous cognizable offences, the police appear to have been specially successful; and, judging from the results, very few cases seem to have been instituted without sufficient grounds. Twelve persons were prosecuted during the year for bad livelihood, and of these 10 were convicted. Convictions were obtained in 139 out of 147 prosecutions for gambling, the number of persons punished being 599. Prosecutions under the Stage Carriage Act decreased by 569, and arrests for street offences under the Police Act fell from 8,895 in 1878 to 4,704 in 1879. Out of 4,552 persons brought before the Magistrates for street offences, 4,503 were convicted. The high ratio of convictions to prosecutions is no doubt due to the pressure put upon the police by the Commissioner to exercise their powers of arrest for petty offences with greater moderation than hitherto, and the result appears to the Lieutenant-Governor to be eminently satisfactory. Owing to the number of cases of pilfering from boats and laden carts in the Northern Division of the town and along the river bank, more persons were stopped in the streets on suspicion of being in possession of stolen goods than in the previous year. The action of the police was, however, on the whole justified by the result. Out of 831 cases, 190 proved to be actual cases of theft; and in 323 other cases the property was confiscated, either because the rightful owner could not be found, or, when found, failed to prosecute. In the remaining cases, when the person stopped in the streets showed that the property found upon him was honestly acquired, he was at once released. Owing to the falling off in the number of ships entering the port there was a further decrease last year in the number of cases under the Shipping Act, the cases reported being only 284, against 410 in 1878 and 551 in 1877. Out of 2,798 persons prosecuted for cruelty to animals, 2,749 were convicted.

4. *Suburbs.*—The number of true cognizable cases was 3,227, against 3,696 in 1878 and 3,194 in 1877. There was an increase in offences against the person and in serious offences against property, while there was a decrease in minor offences against property, in miscellaneous offences, and in offences under special and local laws. In no class of crime, however, was the fluctuation very marked. There were four cases of murder in the Suburbs during the year, and in each of them the murderer was convicted and executed. In one of the cases the victim was a child, who was strangled by one of her neighbours for the sake of her ornaments, which were worth only Rs. 8. There were 15 cases of causing grievous hurt, and in 11 convictions were obtained. There was not a single serious case of burglary in the year, and the average amount of property stolen in the 109 petty cases reported under this head

was only Rs. 11. Of Rs. 1,208 stolen, Rs. 1,029 was recovered. The number of cases of theft was 730, against 776 in 1878; but the property stolen was only slightly more than half that stolen in 1878.

5. Fifty-nine persons committed suicide, against 60 in 1878 and 53 in each of the previous two years. Of the 59 cases, 45 were in the town and 14 in the suburbs; 31 of those who destroyed themselves were men and 28 women. In 26 of the cases death was caused by hanging, in 21 by opium-poisoning, and in 6 by arsenic. Inquests were held by the Coroner in 198 cases, against 151 in the previous year. Of 228 accidental deaths, 10 were caused by snake-bite, 116 by drowning, 31 by falls from trees, buildings, &c., and eight by being run over in the streets; the number of fatal accidents of the class last named was 14 less than in 1878. Fifteen European seamen were drowned in the river as compared with 9 in 1878 and 41 in 1877, and of those drowned, 7 appear to owe their deaths to drunkenness.

6. *Arms Act (XI of 1878).*—There was a great falling off in the imports of arms during the past year, due no doubt to the heavy duty of Rs. 50 now levied on each gun. In the number of pistols, and the amount of gunpowder imported, there was a slight increase. The imports of the past three years are shown in the following statement:—

YEARS.	Sporting rifles.	Sporting guns.	Pistols and revolvers.	Gunpowder.	Shot.	Percussion caps.
	No.	No.	No.	lb.	Bags.	No.
1877	...	186	716	438	84,560	18,894
1878	...	174	365	306	80,000	14,24
1879	...	23	69	341	88,050	10,946

The returns of arms and ammunition passed out of Calcutta under inland passes show a large increase in the number of cartridges and bullets transported, but a decrease in every other form of ammunition. Five hundred and sixty-three licenses under the Indian Arms Act were granted by the Commissioner of Police during the past year, and there were only 4 prosecutions for possessing arms or ammunition without a license. The Commissioner states that there is no provision in the law by which the Executive can enforce section 14, by which persons not exempted from the prohibitions and restrictions in the Act are required to take out licenses for the possession of arms. This point was brought to the notice of Government by Mr. Souttar in July last, but the Lieutenant-Governor could not then, nor can he now, understand wherein the difficulty consists. The procedure to be adopted in the case of an omission to comply with the provisions of section 14 of the Act seems to Sir Ashley Eden to have been clearly explained by the Legal Remembrancer in his letter of the 7th July 1879 to the Commissioner's address. If the Executive authorities consider that an offence under clause f of section 19 has been committed, they can prosecute and apply for a search warrant.

7. It is satisfactory to find that during the whole year only 18 persons were declared vagrants, against 40 in 1878. One vagrant was found to be a deserter from the army, and was made over to the Military authorities. The total number of vagrants in the Workhouse, including six who remained from the preceding year, was 23, and of these seven were discharged on obtaining employment, nine were deported, and two were shipped as distressed seamen. The total cost incurred by Government in working the European Vagrancy Act in Calcutta was Rs. 2,365-8.

8. The pay of the two grades of constables in the town and suburban forces was raised from Rs. 7 and Rs. 8 to Rs. 8 and Rs. 9 respectively from the beginning of the financial year 1879-80; but the Lieutenant-Governor regrets to find that the increase in pay has not resulted in the enlistment of more Bengalis in the force. Out of 1,141 native constables in the Town Police, only 415 are Bengalis, the rest being up-country men; out of 636 native constables in the suburbs, only 100 are Bengalis. A large majority of the officers in both the town and suburbs are, however, natives of the Lower Provinces. Although the increased rates of pay failed to attract Bengalis for service in the town and suburbs, they appear to have had a good effect on the stability and discipline of the force. Two hundred and four men resigned the force or were

discharged during the year as compared with 230 in 1878, and only 26 deserted against 68 in 1878 and 149 in 1877. Again, there were only 57 dismissals in all ranks during the year under review, against 134 in 1878 and 129 in 1877; 6 European constables were dismissed against 16 in the previous year. In consequence of the views expressed by the Lieutenant-Governor regarding the inexpediency of inflicting fines on native constables, the number of these punishments has fallen from 352 in 1876 and 556 in 1877 to 111 in 1878 and 14 in 1879. Sir Ashley Eden is glad to find that, although this form of punishment has now almost ceased, it was found necessary to punish only 37 constables by reduction as compared with 82 in 1878 and 115 in 1877.

9. The total cost of the Town Police Force, including the salaries of the Commissioner and Deputy Commissioner, was Rs. 4,29,159, of which Rs. 2,93,647 was paid by the Municipality, and Rs. 1,35,512 by Government. Against this latter sum must be set off the fees and fines realized during the year, amounting to Rs. 38,530. The cost of the suburban force was Rs. 1,58,217, towards which the Municipality contributed Rs. 76,920 and Government Rs. 81,297. Against the latter sum Rs. 4,376 was realized from fees and fines. The cost of the River Police was Rs. 30,105, of which Rs. 22,579 was paid by the Port Commissioners and Rs. 7,526 by Government.

10. In order to equalize as far as possible the work of the Presidency Magistrates of the Northern and Southern Divisions, the Colootollah Thana was transferred from the jurisdiction of the former to that of the latter with effect from December 1878, and the returns for the past year show a very fair distribution of the magisterial work in the town. The number of cognizable cases brought before the Chief Presidency Magistrate was 6,125, of which 5,508 were instituted by the Police and 617 were preferred direct to the Magistrate; in the Court of the Magistrate of the Northern Division 5,378 cognizable cases were instituted—4,956 by the Police and 422 direct. Out of 6,335 non-cognizable cases instituted during the year in the two courts, 3,025 were before the Chief Presidency Magistrate, and 3,310 before the Magistrate of the Northern Division. The number of convictions in the cognizable cases tried by the two courts during the year was 15,285, and in non-cognizable cases 8,277. Against these 23,562 convictions, the total number of appeals preferred to the High Court during the year was 8, of which 4 were rejected, the sentences in the other 4 cases being either modified or reversed. Two hundred and thirty-seven cognizable cases and 99 non-cognizable cases were instituted before the Special Benches of Honorary Magistrates in the town. At present the independent Bench only meets once a week, and legal difficulties have interfered with the proposal that sittings should be held three times a week, the cost of the Bench establishment being divided between Government and the Municipality. The Commissioner of Police has been asked to suggest some other arrangement for carrying out the Lieutenant-Governor's wishes in this respect, and Sir Ashley Eden trusts soon to receive his report on the subject. The Honorary Magistrates deserve the thanks of Government for the attention given by them to the disposal of cases before the Bench, but the present system under which they can only try very petty cases which can be disposed of at one sitting is not satisfactory. The Lieutenant-Governor would gladly, and with complete confidence, entrust the independent Bench with the trial of more important cases than those that now come before it.

11. Mr. Souttar was Commissioner of Police throughout the year, having joined the appointment on the 15th November 1878. The administration of the police force was under the Deputy Commissioner, Mr. Lambert. To both these officers the Lieutenant-Governor's acknowledgments are due for their successful administration of the Calcutta Police.

ORDER.—Ordered that a copy of this Resolution be forwarded to the Commissioner of Police, Calcutta, for information, and for communication to the Presidency Magistrates.

Ordered also that a copy of the Resolution and of the report be forwarded to the Commissioner of the Presidency Division.

By order of the Lieutenant-Governor of Bengal,

HORACE A. COCKERELL,

Secretary to the Government of Bengal.

**RESOLUTION ON THE REPORT ON LUNATIC ASYLUMS IN
BENGAL DURING 1879.**

MEDICAL AND MUNICIPAL DEPARTMENT.—MEDICAL.

Darjeeling, the 11th May 1880.

RESOLUTION.

READ—

The Report on the Lunatic Asylums in Bengal for the year 1879.

Read again—

The reports for previous years, with the orders of Government passed upon them.

The Report on Asylum Expenditure, by the Committee appointed to enquire into Medical Expenditure in Bengal.

The report is punctually submitted, and exhibits the facts of the year in a clear and concise form. Its bulk has, the Lieutenant-Governor is glad to notice, been considerably reduced.

2. Since the year 1876 there has been a continuous decrease in the number of lunatics in confinement in Bengal. This decrease is the result of the orders of the Government of India issued in that year, pointing out that persons suffering from the temporary results of sickness, intemperance, or debauchery, and those whom their friends ought to support, are not proper objects of public charity; and that besides criminal lunatics, only those patients should be received in State asylums who are absolutely dangerous, or who, having no friends or resources, are in the acute stage of mental disease in which there is most hope of recovery under medical treatment. The strict application of this very reasonable rule has not only reduced the permanent asylum population, but has served to lower the number of new admissions. Thus, the number of lunatics in confinement on the 1st January of each of the last five years, and the admissions of those years, stood thus—

		Remained on 1st January.	Admitted during year.
1880	..	888	..
1879	..	991	173
1878	..	1,077	196
1877	..	1,131	247
1876	..	1,147	1,329
1875	..	1,384	..

3. The existing asylums have accommodation for 1,015 patients. There is no reason therefore why in Cuttack the average population should be in excess of the accommodation, as is shown in paragraph 9 to have been the case. The numbers in that asylum, and also in Berhampore, should be reduced by transfer, so as to leave a reasonable margin for the reception of temporary cases without encroaching on the normal allotment of space.

4. During the year the asylum at Hazaribagh was finally closed in accordance with the intention intimated in the resolution on last year's report. Of the 163 lunatics confined there, 60 were sent to Dullunda, 17 to Dacca, 54 to Patna, and 32 to Berhampore. This asylum, when opened in May 1876, received 95 insane from Berhampore, 60 from Patna, and 95 from Dullunda. The chief facts in its history during the time it was opened are shown in the following table:—

	1876.	1877.	1878.	1879.
Admitted ..	9	10	9	....
Re-admitted ..	11	12	....	....
Received by transfer ..	250	25	....	....
Total population ..	270	245	229	175
Cured ..	4	17*	7	....
Transferred to friends ..	1	9	3	1
Transferred to other asylums ..	11	....	....	163
Otherwise discharged ..	13	13	1	2
Died ..	18	11	43	9
Remaining at end of year ..	223	220	175	....
Daily average strength ..	204	222.06	207.1	....
Daily average sick ..	22.1	21.77	21.39	....

The local admissions were, it will be seen, extremely few; the re-admissions merely represent escapes and recaptures; the death-rate was in 1876 8·82 per cent. of mean strength, in 1877 4·95 per cent., in 1878 20·7 per cent. (a remarkably heavy rate, not accounted for by any epidemic); the sick list was throughout heavier than in any other asylum in Bengal. On the whole, the results of the experimental opening of an asylum in Chota Nagpore were not satisfactory, and it was on every ground advisable to close this asylum.

5. Turning to the statistics of the year, the chief facts affecting the population of each asylum are embodied in the following table:—

ASYLUMS.	Admitted during year.	Re-admitted.	Received by transfer.	Total population.	Cured.	Made over to friends.	Otherwise discharged.	Transferred to other asylums.	Died.	Daily average strength.	Daily average sick.	
Dullunda	64	10	60	275	53	21	19	.....	42	217	217·16	6·65
Dacca	35	7	17	230	10	19	.....	.....	29	198	196·10	8·70
Patna	40	3	54	242	19	14	.....	.....	35	228	228·32	14·7
Cuttack	19	1	.....	68	10	5	.....	.....	3	59	51·30	1·20
Berhampore	15	2	32	197	9	3	.....	.....	22	195	197·08	7·38
Hazaribagh	.....	.....	.....	175	.....	1	2	163	9	.....	.....	.....
Total	173	28	163	1,187	101	63	4	163	131	888	889·96	38·66

It appears that of the total number of admissions 64 were to Dullunda, being only one less than the number admitted in 1878; 35 to Dacca as against 32 in 1878; 40 to Patna as against 56 in 1878; 19 to Cuttack as against 16; and 15 to Berhampore as against 18. The total number of re-admissions was 23 as against 31 in the previous year and 38 in 1877. The rule regarding admissions has of course a corresponding effect upon the number of re-admissions.

6. There were discharged cured 101 persons against 148 in 1878; improved, 57 against 46. The percentage of persons discharged, either cured or improved was 17·75 calculated on the average strength, 13·31 calculated on total treated, and 80·61 calculated on admissions. The average figure under each of these categories for the ten years 1869 to 1878 was 24·35, 17·62, and 58·67 respectively. The variation in the figures is explained by the falling off in the average population, and in trifling and temporary cases, the increase in chronic cases, and the decrease in admissions. The large number of cures in Dullunda seems to be explained by the number of admissions of cases of acute mania shown in Table VI of this and previous reports.

7. The number of criminal lunatics in the asylums on the 1st January 1879 was 288. There were 72 fresh admissions during the year and 13 re-admissions. There is a slight tendency to increase in the figures of admissions, which were 70 in 1878, 68 in 1877, and 63 on the average of the previous ten years. Of the total number under treatment (373), 69 were discharged improved, against 57 in 1878; 28 died against 11, and 276 remained at the end of the year. As explained in last year's resolution, criminal lunatics who recover, but cannot safely be discharged, are now transferred to jails for employment there. The result has been an improvement in the discipline and easy management of the asylums where inmates of this class were a constant source of trouble and danger.

8. The forms of insanity and the percentage of cure under each were as follow:—

Forms of insanity	Number treated.	Number cured.	Percentage of cures.
Acute mania	239	45	18·82
Chronic mania	459	24	5·22
Melancholia	101	4	3·96
Acute dementia	57	1	1·75
Chronic dementia	278	4	1·43
Idiocy	8	.....	.....
Imbecility	5	.....	.....
Amentia	1	.....	.....

The effect of the rule prohibiting the admission of persons whose insanity is the result only of intoxication, so long as they are not dangerous, has reduced the number of admissions for acute mania caused by ganja—a class of cases which furnished the largest number of cures. Thus in 1878, 89 cases of ganja-mania were admitted with 61 recoveries; in 1879 there were only 58 admissions with 41 recoveries. This proportion is slightly in favour of 1879; but the smaller number of such cases in the total of acute mania reduces the

recoveries under that head from 26 per cent. in 1878 to 18. The same influence has also affected the percentage of cure under other heads.

9. The causes of insanity were unknown in exactly half the cases admitted and re-admitted taken together (98 out of 196). In 81 cases physical causes were assigned, and in 17 moral causes; 43 ordinary and 18 criminal cases were ascribed to the use of ganga, bhang, or churru; 5 ordinary and 1 criminal case to ardent spirits; 1¹ ordinary and 1 criminal case to opium. In by far the greater number of known cases, therefore, the use of drugs is believed to have been the procuring cause of insanity.

10. The health of the asylums during the year was by no means satisfactory. Although the total number of admissions to hospital was only 510 as against 739 in 1878 and 818 in 1877, cases of fatal sickness were more numerous. There are no returns of the admissions to hospital at Hazaribagh for the three months during which that asylum was open; and this fact serves to reduce the apparent total of admissions in 1879. If Hazaribagh be excluded altogether, the number of admissions was nearly the same as in 1878, and less by 86 than in 1877. But, as the Surgeon-General remarks, the inmates of Hazaribagh were only transferred to the other asylums, and helped to raise the totals of their sick lists for the remainder of the year. The totals of the year may therefore not unfairly be compared with those of 1878. The following table gives an analysis of the figures for each asylum:—

	Dullunda.	Dacca.	Patna.	Cuttack.	Berhampore.	Total.
Admissions into hospital	69	126	170	35	116	510
Ditto per cent. of mean strength	31'31	61'19	74'45	68'22	58'85	57'32
Daily average sick	6'63	8'70	14'75	1'20	7'58	38'66
Ditto in 1878	3'15	16'07	11'81	1'84	5'74	38'61
Ditto per cent. of mean strength	3'05	4'43	6'46	2'33	3'74	4'34
Ditto ditto in 1878	1'54	8'17	5'83	3'84	2'97	4'67

It is not possible to compare accurately the rates of sickness in the different asylums because, as the Surgeon-General points out, differences of practice exist with regard to the entry of patients in the hospital returns. Thus, in Dullunda the admissions to hospital are fewer than in other asylums because trivial cases are treated as out-patients and kept on a separate list. The Lieutenant-Governor thinks that there should be a uniform rule of practice for all asylums, and that all cases receiving medical treatment during the year should appear in the sick returns. He would be glad if the Surgeon-General would issue orders on the point. It is open to him to make such distinction as he thinks necessary between in-patients and out-patients of the asylum hospitals; but both classes should be taken into account in any estimate of the comparative healthiness of the asylums.

11. The death-rate in all the large asylums was, as already noticed, very high, there being 131 deaths (not 122, as stated in paragraph 17) against 100 in 1878 and 73 in 1877. The Lieutenant-Governor is aware that the mortality in jails during 1879 has also been very high. The increased mortality in the asylums was not due to any increase in zymotic or preventable disease; fever and cholera having caused fewer deaths than usual; dysentery and diarrhoea about the same. The chief increase is, as the Surgeon-General points out, "in pulmonary diseases, which have been fatal in 32 cases against 20 in 1878; and the increase (in such deaths) is confined to the Dullunda Asylum." The following statement compares the mortality of 1878 and 1879 in each asylum:—

	1879.					1878.				
	Mean strength.	Total deaths.	Percentage of column 2 to column 1.	Deaths from pulmonary disease.	Percentage of column 4 to column 2.	Mean strength.	Total deaths.	Percentage of column 2 to column 1.	Deaths from pulmonary disease.	Percentage of column 4 to column 2.
	1	2	3	4	5	1	2	3	4	5
Dullunda	217'16	42	19'34	20	47'62	204'31	15	7'34	7	46'06
Dacca	196'10	20	10'19	7	35'00	196'58	8	4'06	1	12'59
Patna	228'32	35	15'33	4	11'42	202'26	13	6'42	2	15'38
Berhampore	197'08	22	11'16	1	4'54	193'19	16	8'28	2	12'50
Cuttack	51'30	3	5'85	.....	.....	47'85	5	10'44	1	20'60
Hazaribagh	.....	9*	.....	.....	.....	207'1	43	20'76	7	10'28

* In first quarter of year.

It will be seen that the great increase in mortality, viewed as a whole, is a feature common to Dullunda, Dacca, and Patna, and that, although the absolute number of deaths from pulmonary disease in Dullunda is large, the proportionate number of deaths in that asylum from diseases of that class is but little higher than in 1878.

12. Taking the asylums separately, the returns for *Dullunda* for 1878 showed 34 admissions to hospital during the year, and two remaining from the preceding year, or a total of 36 under treatment. Of these, 15 were cured, 15 died, and 6 were left in hospital at the close of the year. There was only 1 case of fever, one of diarrhoea, none of dysentery or cholera, 7 of anaemia, 4 of pneumonia and 5 of phthisis. Of the deaths, 7 were due to pulmonary diseases. In the year 1879 there were 69 admissions to hospital and 75 altogether under treatment, of whom 25 were cured, 1 was discharged, and 42 died. The principal diseases prevalent were anaemia, giving 6 cases; diarrhoea, 5 cases; dysentery, 10 cases; fevers, 2 cases; pneumonia, 3 cases; phthisis, 16 cases. The deaths were due, 3 to anaemia, 1 to asthma, 3 to cirrhosis of the liver, 1 to debility, 1 to diarrhoea, 5 to dysentery, 1 to emphysema, 1 to enteritis, 1 to epilepsy, 3 to exhaustion of mania, 1 to hepatitis, 1 to leprosy, 1 to meningitis, 1 to old age, 1 to pleurisy, 16 to phthisis, and 1 to pulmonary apoplexy. Pulmonary affections thus caused 20 of the 42 deaths. Dr. Payne remarks that this class of diseases has long been prevalent in this asylum, but never before attained the development of the past year; and it appears that the servants of the asylum suffered as well as the patients, though it is not stated whether there were any fatal cases among the former. On the other hand, it is stated that simple acute diseases of the lungs are seldom fatal at Dullunda. Of the six persons who died from diarrhoea and dysentery, four brought their illness with them to the asylum, and in another case old age contributed to the fatal result. Generally it is reported that in five cases of death old age was an important factor, and it is said that in 18 cases the disease was brought to the asylum with the patient. It would at the same time appear from the statement (11) given in paragraph 23 of the report that in the great majority of fatal cases of phthisis the patients had been more than six months in the asylum.

13. The Lieutenant-Governor would wish to have more full and detailed report upon the exceptional mortality of the year both in Dullunda and in the other asylums. It should be investigated specially with reference to the health and mortuary statistics of the year among the neighbouring jail and civil populations. The causes are evidently of a general character, as there was nothing in the working of the asylums during the year to account for the mortality. The changes of diet introduced in Dullunda led to the patients gaining flesh, and no changes were made in the buildings or in the clothing of the lunatics. It should, however, be reported whether there is any ground for suspecting that the character of the buildings at Dullunda has anything to say to the prevalence of pulmonary diseases in that asylum; and if so, it should be considered whether any improvements, such as asphalting the floors, &c., are desirable.

14. In the *Dacca* Asylum there were, in 1878, 189 admissions and 14 cases remaining from the previous year, or a total of 203 under treatment. Of these the great majority were cases of febrile affections, dysentery, and diarrhoea. There were only six cases of pulmonary disease, and the deaths were only 8 in all—2 of these being from diarrhoea, 1 from dysentery, 1 from cholera, and 1 from pulmonary disease. In 1879 there were only 120 admissions and 136 under treatment; but there were 20 deaths—7 from diarrhoea, 2 from dysentery, and 7 from pulmonary diseases. Half the total number of deaths are said to have occurred within a month of admission, by which is meant apparently admission into hospital. As already remarked, Statement No. 11 does not show that these pulmonary diseases were most fatal among new admissions to the asylums. As regards zymotic or preventible diseases, the health of this asylum has greatly improved of late years, as the following statement proves:—

		Admissions to hospital.				
		1875.	1876.	1877.	1878.	1879.
Fevers	...	128	113	53	49	30
Diarrhoea	...	64	67	44	40	14
Dysentery	...	47	40	37	15	8

15. In *Patna* asylum also the returns of sickness and mortality present similar features. The number of admissions in 1878 was 81, and the total under treatment 86. The deaths were 13, of which 4 were due to fever and 3 to spleen congestion, 3 to diarrhoea and dysentery, and 1 to phthisis. In 1879 there were 170 admissions and 172 under treatment, with no fewer than 35 deaths. Pulmonary diseases and cholera were both in excess, the former accounting for 3, the latter for 6 deaths. Diarrhoea and dysentery caused 9 deaths. Dr. French reports that of the 35 patients who died, only 6 were in good or fair health on admission, 11 were distinctly weakly, and 17 actually sick.

16. At *Berhampore* pulmonary disease was less manifest, but dysentery and diarrhoea were in excess. The returns for 1878 showed 189 cases under treatment, of whom 16 died, in 10 cases the cause being dysentery or diarrhoea, and in 2 pulmonary complaints. In 1879 there were 116 admissions and 125 under treatment, of whom 22 died—12 from diarrhoea and dysentery, 3 from dropsy, 2 from old age, 2 from epilepsy, and 1 from pneumonia. Of the total number of deaths, 10 were among the 32 lunatics received from *Hazaribagh*.

17. In *Cuttack* there were 35 under treatment as against 28 in 1878; but the deaths were only 3 as against 5. This asylum had no losses from pneumonia, dysentery, or diarrhoea.

18. Cases of accident and injury show a satisfactory decrease in number. In the *Dacca* Asylum the improvement is particularly marked. Formerly there used to be 13 or 14 cases per annum in this institution, indicating either a want of discretion in the selection of lunatics to be trusted with tools, or defective discipline and negligence on the part of the keepers. Last year there was only one case of injury caused by one lunatic to another; one case in which a keeper was injured by a lunatic; and one unfortunate case in which a cook, wrestling in sport with a patient, threw him and dislocated his neck. *Patna* and *Dullunda* had only two cases each, all caused by patients. In *Cuttack* and *Berhampore* there were no cases of injury.

19. The gross cost of the asylums during the year was Rs. 96,648 against Rs. 1,21,936 in 1878. A saving of Rs. 18,521 was effected by the closing of the *Hazaribagh* Asylum. The average cost per patient did not, on the whole, differ materially from that in the year preceding.

20. The Lieutenant-Governor has lately, upon the report of the Committee on Medical Expenditure, given orders for preparing the financial statistics of asylums upon a uniform plan. These orders were not, however, issued in time to affect the returns of 1879. It is not therefore worth while to compare the relative cost of the different asylums in that year, or to enter at any detail into the question of the gross and net cost of each asylum, the Committee having shown that conclusions drawn from the figures as they stand must necessarily be fallacious. It is, however, desirable here to correct a misapprehension on the part of the Surgeon-General as to the meaning of paragraph 14 of the Lieutenant-Governor's resolution on the Committee's report. When raw material purchased for diet, clothing, lighting, or other purposes is worked up and issued for asylum use, only the actual money cost of the articles to Government must be shown in the statements. No charge should be added to represent the value of lunatic labor, and no profit should be charged. It is only when manufactured goods are sold to the outside public that such charges should be added. It is of no practical use to swell the account against Government by nominal entries for asylum labor and profits.

21. Generally speaking, in *Dullunda* the cost of diet was less than in 1878; as also was the cost of establishment. The returns from manufactures were less owing to a fall in market prices, the absence of the Deputy Superintendent on leave, and the transfer of laboring inmates to jails and unremunerative work. In *Dacca* the expenditure on diets, clothing, and contingencies was in every instance less, notwithstanding the high prices of food which ruled for nine months of the year. The profits from manufactures showed a slight falling off owing to the exhaustion of the asylum brickfield. The other asylums also show slightly decreased cost, and the superintendents everywhere deserve credit for their careful supervision and economical administration. Next year it should be possible to compare more closely the working of the different institutions.

22. The plan of crediting the lunatics with part of the money value of their labor is only found to answer when the proceeds are given out at once in the form of extra indulgences. That is perhaps the best shape in which to reward the ordinary chronic patients; but where there is a fair prospect of cure, the money earned should be set aside for the patient, and be given him on discharge. The daily average number of lunatics employed in useful work was 763·23 out of a daily average strength of 889·96.

23. In the foregoing paragraphs only the native asylums of the province have been considered. The statistics of the European asylum at Bhowanipore are set out by the Surgeon-General in the concluding paragraphs of his report. On the 1st of January 1879 there were 20 patients remaining over from the preceding year. Twenty were admitted in 1879 against 23 in 1878, of whom only 2 were from the army. Of the 40 under treatment, 4 were cured, 1 made over to the military authorities, 4 sent to Europe under the Merchant Shipping Act, 7 made over to friends, and 4 died. Of the 4 deaths, 2 were due to old age, 1 patient having been 47 years in the asylum. One patient was dangerously ill on admission. The fourth died from the exhaustion of long-continued maniacal seizures. The cost of the asylum was Rs. 22,095 against Rs. 25,106 in 1878. The number of first and second class paying patients was much less—6 against 14 in 1878. This caused a reduction in cost of diets and servants. The average daily cost of each European patient was as follows:—

			Rs.	A.	P.
Paying patients, 1st class	...	...	1	2	9
Ditto 2nd „	...	...	0	9	4
Ditto 3rd „	...	...	0	6	0
Pauper patients	...	...	0	4	9

The diet of the pauper patients may be compared with that of European prisoners in the Presidency Jail, where a European laboring prisoner's diet costs 4 annas 5 pie daily, and a non-laboring diet 3 annas 1 pie (exclusive of vegetables from the jail garden). As Dr. Payne remarks, an average non-laboring lunatic does not require more food than an average laboring prisoner. The extra cost of the asylum diet is caused by difference in quality.

ORDER.—Ordered that a copy of this Resolution, together with a copy of the Report, and a copy of the Report of the Committee on the Medical Expenditure of Asylums, with the Lieutenant-Governor's Resolution No. 68 of the 26th January, be submitted to the Government of India in the Home, Revenue and Agricultural Department for information.

Ordered also that a copy of this Resolution be forwarded to the Surgeon-General, Bengal, for information and guidance.

By order of the Lieutenant-Governor of Bengal,

A. MACKENZIE,

Secretary to the Government of Bengal.

No. 2040, dated Calcutta, the 20th May 1880.

From—A. J. PAYNE, Esq., M. D., Surgeon-General for Bengal,

To—The Secretary to the Govt. of Bengal, Medical and Municipal Department.

In conforiaing to the Lieutenant-Governor's wish for a more complete report on the mortality in the Lunatic Asylums of Bengal in 1879, I beg to say that, when my original report was submitted, I was conscious that I was offering the Government little more than a summary of events. I knew that much time would be needed for preparation of the reports on the Calcutta medical institutions and the dispensaries of the province, and had no hope of producing these within the prescribed period, unless the asylum report, the least important, were speedily finished. It was thus impossible for me to make the references and obtain the other information required for the fuller discussion of matters which have very naturally appeared to the Lieutenant-Governor to have been inadequately treated.

2. Haste in preparation led also, I regret to say, to some inaccuracies in my report, which I may now indicate.

Paragraph 5.—The average numbers of inmates were copied from paragraph 6 of the report for 1878, which was so headed as to lead to the supposition that the figures represented average populations, whereas they were

really total numbers treated for the two years particularised, and an average of total numbers treated for the preceding ten years. I propose to substitute the following paragraphs for paragraph 5 of my report:—

Total numbers treated.—The average of the total treated for ten years ending with 1876 was 1,281, males 1,008, females 273; in 1877 the number was 1,416, males 1,132, females 284; in 1878 the total was 1,304, males 1,037, females 267; in 1879 total 1,187, males 946, females 241.

Daily asylum population.—For ten years ending with 1876 this was 888; in 1877 it was 1,117, males 889, females 228; in 1878 it was 1,051, males 831, females 220; in 1879 it was 889, males 697, females 192.

Paragraph 17.—The death numbers, viz. 122, 100 and 73, are mentioned as though they included the deaths at Hazaribagh in the beginning of the year. They include really only the deaths of Hazaribagh lunatics after transfer in 1879. The figure 122 should be 131. It is also said that the increase in fatal pulmonary disease was confined to the Dullunda Asylum. It would have been right to say that the total increase of 32 over 20 deaths from such disease was covered numerically by the Dullunda figures alone; but the truth is that the increase at Dacca, from one to seven deaths, was proportionally, though not absolutely, larger than the other, as shown in my 19th paragraph. Again, in paragraph 17 there is an error quoted from the report on the Dullunda Asylum. It is said that the death-rate of the people from Hazaribagh was less than that of the general population at Dullunda. It was overlooked that the eight deaths among the former occurred in nine months, and they were treated as though they had occupied a year. The true annual death-rates calculated on total numbers were 17 per cent among the people from Hazaribagh and 12·3 per cent among the others.

3. The first point to be noticed concerning the mortality of 1879 is that there has been great increase in the death-rates of all the asylums; Cuttack, from the smallness of its numbers, being left unconsidered. There was no epidemic disease. The public health of the year, so far as it is yet known, was generally better than 1878. If, therefore, the mortality of the asylums have a common cause, it will probably be in great part a cause special to themselves. Such a cause existed in the distribution between the affected asylums of the lunatics from Chota Nagpore. These people had been dying in large numbers at Hazaribagh up to the time when the asylum was closed. The state of health in which they reached Calcutta and Berhampore was very bad, and it was probably not much better at Patna. Of 60 persons sent to Dullunda eight died; of 54 sent to Patna six died; of 32 sent to Berhampore ten died, and of 17 sent to Dacca one died. Of the total number distributed, viz. 163, there died in the several places 25 persons in nine months. At Hazaribagh, in 1878, of a total of 229 persons, there had died 43; and during the first two and a half months of 1879 the deaths were nine in 175, or nearly 27 per cent of the total per annum, a rate much higher than the highest recorded elsewhere. Thus, though the transfers added largely to the death lists of the other asylums, the transferred people gained by a reduced death-rate among themselves.

4. Having regard to the great influence on mortality of the condition in which persons newly admitted reach an asylum, it would be more correct to reckon death-rates on total numbers treated, as is done in hospitals, than on the average population, as is done in jails. I append a statement showing the numerical relation between admissions and deaths in 1879, the former including transfers from Hazaribagh as well as re-admissions.

	Total treated.	Deaths.	Admissions.
Dullunda	...	335	134
Patna	...	296	97
Dacca	...	247	59
Berhampore	...	229	49

Here the indication is very pointed. It is disturbed only by the case of Berhampore, where the death-rate among the transferred persons was very high. If the transfers be separated, the order will be unbroken, viz.—

	Total.	Deaths.	Local admissions.
Dullunda	275	34	74
Patna	242	29	43
Dacca	230	19	42
Berhampore	197	12	17

5. Of the 134 persons admitted into Dullunda Asylum, 40 only reached the asylum in good condition, and there were 14 deaths in the total number. At Patna, of 97 persons admitted, 57 were in bad or indifferent health. The actual number of deaths among these was 13. Of the 35 persons who died, only five were in good health on admission and 17 were actually sick or in bad health. At Dacca nothing is said of the condition of lunatics received in the aggregate. The register gives only four deaths among the admissions of the year; and of the 20 persons who died, nine are recorded as in good health on admission. One of them had come from Hazaribagh. Dr. Shircore at Berhampore speaks of the wretched condition of the lunatics from Hazaribagh, but says nothing of the local admissions of the year. Among the latter there were no deaths in 1879; among the former there were ten. Of the entire number of fatal cases, four only are said to have reached the asylum in good health.

6. It is necessary next to consider the influence of sickly admissions on the *increase* of mortality in 1879, that is, the difference between the deaths among new admissions in 1878 and 1879. So far as I can yet learn, there has been less public sickness in the latter year throughout the province, except at Patna, where 1879 is reported to have been more unhealthy than any year since 1874. Lunatics at large share in very full measure the influence of season.

At Dullunda there were five deaths among new admissions in 1878 and 14 in 1879; at Patna three in 1878 and 13 in 1879; at Dacca four in 1878 and four in 1879; at Berhampore two in 1878 and 10 in 1879. The four asylums shewed increase of deaths from 52 to 119, a difference of 67, whereof 27, or the sum of the foregoing differences, were contributed by new admissions. Separating these new admissions, we obtain the following figures for the older residents:—

	Total treated.	Deaths.
Dullunda ...	201	28
Patna ...	199	22
Dacca ...	188	16
Berhampore ...	180	12

General indications go no further than this. They shew that, of the increment of deaths in 1879, nearly one-half were among the admissions of the year, and they dispose entirely of the increment in the Berhampore Asylum; for the excess of fatal illness there was more than covered by that of the newcomers.

7. I will now examine the special facts of mortality in the several asylums. It must be remembered that in all these asylums the deaths were exceptionally few in 1878. If it were possible to determine a normal death-rate, it would probably be as much above the rate of 1878 as below that of 1879. With great variation of season, averages of years are insufficient for this purpose. So far as averages shew, Bengal Asylums compare very favourably with other asylums both in India and elsewhere. This introduces the question of the deaths of a year as a measure of the sickness of the year; which, however, cannot be fully discussed on the returns. These show, not the duration of illness, but the duration of the last sojourn in hospital, and the full history of the large number of sickly men who are treated as out-patients for months, or are properly allowed to live in the wards and take light employment, does not appear. The returns, nevertheless, give some useful indications on this point, as will be seen below. Asylum diaries should give all that is needed. I drew attention to this matter in the 23rd paragraph of my report with reference to table No. 11, intending to intimate that the number of deaths occurring among persons admitted in a given period does not by any means represent the full effect of imported disease on asylum mortality; inasmuch as chronic illness, present on admission, is protracted from year to year in many instances. Neither do the deaths shew the production of primary sickness in the given period, though they may shew the effects of season on chronic invalids, both new and old residents. No tabular statement could be a sufficient guide to full knowledge on these points.

8. Of the deaths in 1879 at Dullunda, three were due to anaemia. Two of these were chronic invalids of over two years' residence. One brought his condition to the asylum and partially recovered for a time. The other was a sufferer from chronic fever on admission. Neither contracted his illness

in 1879. The third came from Hazaribagh fatally ill, and lived 29 days. This third case represented the increase of anaemic death at Dullunda in 1879.

The death from asthma was in a very old man, a drunkard, several times admitted and discharged. His disease affected his heart in the course of years, as it commonly does, and death was a question only of time.

The death ascribed to emphysema was from the same condition, except that the man had been 25 years in the asylum and was not a drunkard. Clearly these two cases do not point to original sickness of 1879.

Cirrhosis of the liver was fatal to three persons, all of them chronic invalids, one a hillman. This organic condition is not common among natives. It is commonest among drunkards elsewhere, and has no connection with season or other general cause. The death from debility should rather have been entered as due to old age. The date of the man's admission is unknown. It was before the earliest records. Old age, without disease, account for two deaths in 1879, and for one only in 1878. The year is not responsible for this difference.

Diarrhoea and dysentery caused six deaths in 1879 and none in 1878. Four of these cases were ill from admission with the disease. Two represent asylum sickness of 1879.

This increase of dysentery may bring to the Lieutenant-Governor's recollection some remarks submitted in my report on the Medical Institutions of Calcutta for the past year. I pointed out that, with general improvement in the public health, there had been unusual prevalence of fatal dysentery in the town and suburbs. The neighbouring jails repeat the evidence. The deaths from bowel disorders have been as follows:—

			1877.	1878.	1879.
Alipore Jail	32	50
Presidency Jail (natives)	10	8

Enteritis caused one death. The man came from Hazaribagh, but his illness was acute, unconnected with his state on admission.

The epileptic person brought his disease with him, two and a half years before his death. The year was not responsible for this.

Exhaustion of mania caused three deaths. One was nearly three years in the place with recurrent seizures; in wretched condition on admission and throughout. The others were admitted in 1879. One was kept alive by artificial feeding for some months; the other for a few days only. These three deaths are in excess of 1878. How far they belong to the asylum, and to the year 1879, may be inferred from what I have said.

Hepatitis. This name has been given to an old case of enlarged liver and spleen, which originated in the asylum. Leprosy was fatal to an old man of 22 years' residence. It originated in the asylum, but not in 1879.

Meningitis occurred in a case of long standing debility and old age.

The death from pleurisy was from illness contracted in 1879. That from pulmonary apoplexy occurred in an old asthmatic, ill on admission.

Thus, of the four pulmonary non-phthisical deaths, three resulted from old asthma dating long before 1879. There occur in countries, where pulmonary diseases abound, years which are peculiarly unfavourable to sufferers from such disorders. Some curious evidence regarding 1879 in the neighbourhood will presently be adduced.

I would here draw attention to the mortality among lunatics transferred from Cuttack to Dullunda. Of 17 persons so transferred since November 1876, no less than six died in 1879, and since the arrival of the party no less than nine have died. All were chronic invalids, and six were more or less ill from their admission.

9. It would seem that a sufficient account has now been given of the events of the year at Dullunda in relation to ordinary diseases. It remains to consider more fully the prevalence of pulmonary consumption and its apparent increase in 1879. There were five deaths from the disease in 1878 and 16 in 1879. Some of this difference is due to the method of annual grouping. The deaths of the year, as I have said, do not represent the sickness of the year in chronic disease. Of these 16 fatal cases, no less than five came forward from 1878 and previous years, and of these five, three were ill on admission to the asylum. Similarly, cases belonging to 1879 will have passed on to 1880, and one year will commonly be on equal terms with another in this respect;

but the question now is one of apparent increase in 1879, and the point to be observed is that the fatal cases, protracted into 1879, equalled in number the whole of the phthisical deaths in 1878. Of the remaining 11, eight were among the new arrivals of the year, all ill on admission. Of these last, four came with their disease from Hazaribagh, and it is remarkable that these four were originally sent to Hazaribagh in good health from Dullunda, where one had lived upwards of 30 years. So far therefore as sickness originating at Dullunda is concerned, there is, in the remaining three cases, nothing to shew large or exceptional production of phthisis there in 1879.

10. But this does not exhaust the subject. Of the chronic cases described as ill from admission, it is not proved that all were *phthisically* ill from admission. Most of them were so undoubtedly; some are believed to have been so on good technical grounds, from the subsequent development which their illness took. Physical examination of the lungs of lunatics is often quite impossible and still oftener inconclusive. Phthisis in India is, among sane people, very insidious in its approach, and among lunatics early evidence is in many cases unobtainable. A slight fever recurring, or progressive loss of weight at Dullunda, draws attention to the lungs and they are examined; sometimes with results, sometimes with none; and often a man is treated as an invalid, or by special means, on mere suspicion. On the other hand, *post mortem* examination not unfrequently reveals a phthisical condition which could not be known with certainty before. Examination *post mortem* is indispensable in every case of death in a lunatic asylum. The tendency to phthisis among lunatics was long ago established in Europe.

11. For the sake of completing the enquiry, I will deal with the possibility of weak or sickly persons becoming phthisical at Dullunda, who might have escaped the disease elsewhere, and consider all the life-circumstances which have been from time to time supposed to tend to its production, viz. the influence of air, food, clothing, and the state of the soil.

As to pure air and breathing space there is not much to be said. Of the atmosphere the lunatics have full benefit. Their lives are spent by day practically in the open air. At night they sleep in rooms well raised on arches, well ventilated and dry, having floors of asphalt. The space is ample. Ventilation, though good, is less perfect in the female wards, but here phthisis is comparatively rare.

Food has been good and sufficient throughout. In 1879 it was better adapted than before to the habits of the people, if increase of flesh be evidence. The diet scale, however, had little to do with the fatal cases, of which the majority had been fed on extras, as weak persons when not in hospital.

Clothing is extravagantly good. Home-made blankets, of weight and substance unknown in the market, are supplied in any number that may be required, and made into coats that the people may wear them at work in damp or chilly weather.

12. The soil is, as to its surface, perfectly drained. There is not a puddle to be seen half an hour after the heaviest rain; but of the sub-soil I cannot give so good an account, and this is very important if there be a tendency to phthisis at Dullunda. Among the evidences of causation advanced from time to time concerning phthisis, none has been seen to meet so many of the facts, and none has received such wide subsequent confirmation and acceptance, as the conclusion which followed the enquiry of the Privy Council into the results of main drainage in 25 English towns in 1866. It was placed beyond doubt that towns notorious for the prevalence of phthisis became comparatively free from it when their sub-soil water was withdrawn. Many years ago, when searching for a reason for high mortality at Dullunda, while the Presidency Jail close at hand was very healthy, I could discover nothing but a great difference in the level of the sub-soil water. The relation of this to phthisis was not then known; but it may now be mentioned, as an interesting difference between the two situations, that in the jail the sub-soil water is very low at times, when in Dullunda it is within a few feet of the surface. The proximity of the two places does not prevent this difference, for the same may be seen in other parts of Calcutta. Of course actual measurements, carried on through an entire year, would be necessary to establish the fact of this difference as otherwise than accidental. The evidence, however, as it stands,

is quite as good as that of the local production of phthisis at Dullunda. The occurrence of the disease in the two places, apart from its production, may be examined here in order to leave nothing unsaid.

13. In the Presidency Jail in 1879 there were admitted into hospital eight natives on account of phthisis. There had been nine in 1878 and 20 in 1877. There were no deaths in 1879 or in 1878 from phthisis, but four in 1877. Short-term prisoners do not remain in jail to die of chronic illness. The figures only shew that there was no increase of phthisis here in 1879. At Alipore the admissions did not differ materially in the three years, but the deaths in 1879 were ten only against 15 in each of the earlier years. The course of other pulmonary diseases appears in curious contrast. It was as follows :—

	Admissions.			Deaths.		
	1877	1878	1879	1877	1878	1879
Alipore Jail	...	150	125	144	9	17
Presidency Jail (natives)	...	50	78	142	4	9

I must leave these figures to carry with them such significance as they may. They do at least suggest a reason why three old asthmatics should have succumbed at Dullunda in 1879, and why the year should have proved fatal to chronic phthisical invalids; but they will give no clue to the production of phthisis, if there should hereafter be reason to suppose that the disease is produced in the asylum.

14. It is unfortunate that the enquiry cannot be extended by means of the records of the Health Office of Calcutta. Pulmonary diseases are the class concerning which, above all others, these records afford no guidance. Acute chest diseases, attended with heat of skin, are for the most part returned as fevers, and their prevalence or otherwise cannot be inferred with even an approximation to truth. Those unattended with heat are named asthma. Some little evidence may be gathered from the admissions into hospital. The number of natives admitted in 1878 to four hospitals for pulmonary disease, other than phthisis, was not unusually large; but the fatality was greater than in either of the preceding years. The same is true of phthisis on the figures. The hospital returns of bowel disorders exhibit reduced admissions, but extraordinary fatality, as already said.

15. In the Patna Asylum deaths rose from 13 in 1878 to 25 in 1879. If the latter year were one of improved public health in Bengal generally, it was not so at Patna, where it is described as the most unhealthy year since 1874. The increase here was in the ordinary climatic diseases chiefly. Cholera prevailed in the neighbourhood, and there were six deaths in the asylum. There had been none in 1878. Diarrhoea caused four deaths in 1879 against two in 1878; Dysentery five against one; fever seven against four; pulmonary diseases four against two. Here also a case of cirrhosis of the liver is entered in 1879. Not having access to the asylum diary, I am unable to trace the histories of the several cases at Patna. The register of fatal cases shews 13 deaths within a year of admission, of which six were from fever and dysentery, all of persons sick on admission; and of the entire number of persons who died, five only are noted as healthy on admission. The sickness of the asylum corresponded closely with the prevailing sickness in its neighbourhood, and with that of the Patna Jail in respect of cholera and bowel diseases. The Superintendent mentions "dampness, chills, and cold" as producing the chief admissions into hospital. Five deaths are ascribed to general debility, which probably are cases of the same kind as those called anaemia at Dullunda.

16. In the Dacca Asylum the increase of mortality fell on sufferers from bowel affections and pulmonary diseases. There were under the first head nine deaths in 1879 and three only in 1878; under the second, seven in 1879 and one in 1878. The sick lists of the last five years at Dacca show great improvement in asylum health; but this, as I have said elsewhere, depends on difference of practice in recording admissions to hospital. The Superintendent, in his report for 1879, says little of the mortality. The register of deaths gives the following information. Of the bowel diseases, two cases were among the admissions of the year, but received in fair health. Of the other residents, three were in bad health on admission, but one of them had been 12 years in the place. The cases of pneumonia all originated in the asylum during the

year, as did one of pleurisy. Phthisis occurred among old residents only, and they are noted as having been healthy on admission.

At Dacca, then, there was increase of fatal sickness in the asylum in 1879, especially in diseases of the bowels and lungs. Dr. Crombie altered his diet scale during the year and was not completely satisfied with the change, as he found some loss of weight among the people in the cold weather. On examining this loss, I found it to be not only less than is usual with natives in the cold months, but actually less than the daily fluctuations of a healthy man at all seasons; and as minor fluctuations had taken place in the interval, of a perfectly normal kind, there is no more reason for connecting increased mortality at Dacca with the change than there is at Patna, where no change took place.

At Dacca, again, the jail figures are significant in respect of pulmonary disease.

	Phthisis.			Respiratory affections.			Bowel disorders.		
	1877	1878	1879	1877	1878	1879	1877	1878	1879
Dacca Jail.									
Admissions into hospital	4	3	5	36	35	43	120	246	252
Deaths ...	0	0	3	4	2	10	6	9	11

Of bowel diseases the jail suffered no material increase. The Mitford Hospital shewed no increase of other pulmonary affections, but some little increase of phthisis over 1878. Of bowel disorders there was diminution.

The public health in the town and district of Dacca showed marked improvement. Bowel disorders were reduced; pulmonary diseases are not distinguished in the sanitary returns. In probable accordance with this general improvement, nothing is said in the asylum report of the condition of lunatics on admission.

17. At Berhampore the additional deaths were due as follows: to dropsy three; to bowel disorders two. There were 12 deaths from the latter in 1879 and ten in 1878; from the former there were none in 1878. Of the 12 cases, seven brought their illness from Hazaribagh, and one of the other three. The increase of mortality at Berhampore being more than explained by the state of the lunatics from Hazaribagh, it is unnecessary to enquire further. The health of the town and district was good, bowel disorders being greatly reduced. There was increase of death from bowel disease in the jail, but none from phthisis or other respiratory disorders.

18. As summary conclusions from the foregoing facts and figures, I submit the following:

Having regard to the very low death numbers of 1877 and 1878, an aggregate increase of 31 on the latter has not necessarily any pointed significance.

The health of the lunatics confined at Hazaribagh had become very bad, particularly in respect of pulmonary disease. Their return to the plains, though beneficial to themselves, largely increased mortality in the asylums which received them in three out of four instances.

That where the entire mortality was largest, it corresponded closely with the public health of the neighbourhood. At Patna the asylum shared the general sickness from zymotic disease. At Calcutta the asylum suffered from those special diseases which had shown increased fatality outside amid general improvement in the public health. At Berhampore the public health was good, as was that of the lunatics locally received. At Dacca there was unexplained increase of death from bowel affections, while in increase of pulmonary disease the vicinity corresponded. Where mortality was large, chronic invalids felt severely the special influence of the season—both newcomers and old residents. Although there is no proof of increased production of constitutional phthisis, those persons in whom this had become a pulmonary disease suffered from a season which was notably unfavourable to pulmonary invalids in general.

The method of grouping facts for annual reports is more or less artificial. A record of deaths within a given period is not evidence of production of disease within the period where chronic maladies are concerned, although in regard of most zymotic and acute diseases a year is a natural unit of time.

Nowhere was there such original production of sickness in the year 1879 as would point to any removable cause within the walls of an asylum, either of a general or special character.

19. I am unable to offer any suggestion for improvement, and propose only to provide that examination *post mortem* be made an invariable practice when death takes place in an asylum, with a view to closer comparison in respect of conditions which may be variously named, and with exception only of the rare cases in which friends of the deceased may raise objection.

No. 325T, dated Darjeeling, the 3rd June 1880.

From—A. MACKENZIE, Esq., Secretary to the Government of Bengal, Medical and Municipal Department,
To—The Surgeon-General, Bengal.

I AM directed to acknowledge the receipt of your letter No. 2040, dated the 20th ultimo, submitting a supplementary report on the mortality in the lunatic asylums of Bengal in 1879, and in reply to say that the Lieutenant-Governor is much obliged to you for the promptness and completeness with which you have supplied the further information desired by Government.

2. It is satisfactory to find that the increased mortality of the year in the asylums does not point to the existence of normal causes of a preventible kind, or which might have been foreseen. The influence of the sick lunatics transferred from the very unhealthy asylum of Hazaribagh upon the returns of the other asylums is of itself sufficient to explain most of the excess mortality, and for the rest, seasonal influences and the natural rise after an exceptionally low rate of mortality fully account.

3. The Lieutenant-Governor entirely approves your suggestion that *post mortem* examination should be made, and the results recorded in all cases of death in asylums, when the friends of the deceased do not object.

4. It will also be desirable to watch closely the history of phthisis at Dullunda in future, to test the existence or otherwise of local conditions (such as sub-soil water-logging or the like) calculated to favour the development of that disease.

CONDITION OF DISTRICTS SUFFERING FROM EPIDEMIC FEVER.

No. 163M.F., dated the 12th March 1880.

From—J. M. COATES, Esq., M.B., Sanitary Commissioner for Bengal,
To—The Asst. Secy. to the Govt. of Bengal, Financial Department (Sanitation).

I HAVE the honor to submit the report called for in your letter No. 102 of 29th September 1879, asking to be informed of the present actual condition of things in the localities subject to the endemic fever, and whether the health of the tract in the neighbourhood of the Dankuni project has been benefited by the works carried out there.

2. It is much to be regretted that our statistics do not help us in this matter. The returns show that the death-rates from fever in 1874 were 5·9 per 1,000 of population in Burdwan, 7·6 in Hooghly, and 5·9 in Midnapore, this being the year in which these districts were severely and generally affected by the disease. In 1879, on the other hand, when there was no fever above the normal amount, the returns show the rates of 16·03, 14·59, and 7·99 for these districts respectively. The fact is, as pointed out in the last annual report, that the large omissions in death registration of former years are becoming fewer and fewer. Our statistics therefore show now an increase in the number of deaths recorded, though we know there has actually been a decrease of mortality. This holds good not only for the fever tracts but for all Bengal.

3. *Burdwan.*—When visiting Burdwan in September last, so little fever was said to prevail that the Civil Surgeon and Magistrate did not think it necessary for me to visit any portion of the district.

4. The Assistant Surgeon reports that "the fever attained its maximum in 1872-73, and became less and less year by year, losing its virulence and being attended by less mortality. Since its appearance in the district, annual outbreaks have occurred up to 1878, but the year 1879 seems to be almost free from it. It is the most healthy year since 1869; only a very small number of fresh cases died. The casualties occurred in chronic cases of spleen, liver, dropsy, and cancrum oris. On the whole Burdwan was much changed in 1877-78. The people nearly regained their former health and strength, and were better able to attend to their daily avocations. Much of the rice-fields, forsaken in former years in consequence of the fatal disease, were again brought under cultivation, and the prospects of the people and of the country generally looked improved and encouraging. The schools and patshalas, which during the fever years were almost deserted, now teem with boys blooming in health. In the jails and public institutions the same improvement was visible. In the civil and criminal courts the renewed health of the officers, the lawyers, and the people seeking justice therein showed that the fever had abated everywhere, and the want and suffering of previous years showed nowhere. In 1879 the above happy state of things continues. Some villages are noted where the remains of old mud-walled houses of people dead and gone still stand out in broad relief to tell of past devastation, yet the busy life of the villagers, their comparatively ruddy appearance, the glee and mirth of the children, the increasing cultivation, all show indications of returning health." In places, however, situated in low lands, having little drainage and bearing a marshy character, the fever still lingers, as in some villages to the north and south of the Banka; in others bad water contributes largely to their unhealthiness, as at Bood-Bood. The Assistant Surgeon also observes that "though year by year, without any perceptible improvement in the sanitary or other conditions of the people, the fever has been gradually subsiding, yet wherever sanitary works were undertaken the health of the locality has improved materially. The admission of the Damuda water into Burdwan by means of a sluice-gate at Jujuti has in a great measure improved the drinking water of the town itself and of the villages on both sides of the river, and has contributed to make the localities benefited comparatively healthy. In consequence of the silting up of the mouths of the Kana muddi and other connected channels, the beds of these presented a series of stagnant and foetid pools contaminating the water and generating malaria. Now that a channel has been cut connecting these watercourses with the Damuda, a large volume of pure water has been freely introduced, cleansing these channels of the

impurities and improving the water-supply. The rain water is now freely drained off, making the localities which were formerly water-logged somewhat dry, and the result is an amelioration of the health of the villages along the sides of these channels. Besides the above, a large number of old tanks were re-dug and cleaned out in 1873 by advances made under the Land Improvement Act. This has undoubtedly improved the drinking water-supply, and the health of the people in those localities appears to have become better. No outbreak of fever of any intensity, so far as I am aware, has occurred wherever these sanitary measures were carried out to any great extent."

5. I submit the above remarks of the Assistant Surgeon because it is independent and reliable native testimony from one always at work, observing and treating the disease, and living among the people. With every word of his statements both the Magistrate and I so fully concur that we do not think it necessary to offer any comments thereon.

6. *Hooghly*.—I visited Hooghly and made special inquiries of the Civil Surgeon and others. The former said that no applications for medical aid had been made to him, and no reports of special sickness had been made from any part of the district. The cases of ague treated in the Hooghly dispensary had decreased about 40 per cent.

7. As shown in Mr. Pellew's admirable note of June 1878, the fever took two courses through the Hooghly district—one down the right bank of the Hooghly, and the other extending among the villages on all the silted up streams lying between the Damuda and the Hooghly. This note is of value, as it proves, first, that the roads and railways had no influence on the progress of the fever, and that therefore the theory of their interrupting the drainage and thus causing the disease falls to the ground; second, that the admission of the Damuda water into Kana nuddi in 1873, 1874, and 1875 was followed by an immediate and marked amelioration in health, after which period a relapse occurred. Of the currency of this opinion, he adds, "there can be no doubt;" he "found it in every one's mouth." Third, that in 1877 the tide of the epidemic fever had completely passed away, and only the pools remained; and that on the Kana nuddi it was still fatal, and on the Hooghly a much less malignant type prevailed.

8. Assistant Surgeon Dutt of Serampore, who visited the villages along the Kana nuddi lately, was told by the inhabitants "that the letting in of the Damuda water was a most welcome relief, and that but for it parts of the country would have been entirely depopulated." He adds: "the water-supply of the villages had deteriorated to the last degree, and bad water was the cause of much sickness. The river had silted up, and was obstructed by a series of bunds placed across the river by the people to retain water for agricultural purposes, and it no longer served as the drainage channel of the country. When the Damuda water was let in these obstructions were removed and the streams were filled with pure water, which the people conveyed to their tanks by means of drains. The relief was temporary, for the supply of water was stopped during 1876 and 1877, and the health of the places along these river banks again deteriorated. It has been allowed to flow in 1878 and 1879, and the people say that the epidemic had disappeared since the last two years. These facts leave no doubt that the letting in of the Damuda water into the Kana nuddi, and through it into the khals, drains, tanks, &c., in the interior of the sub-division, has led to the improvement of the health of the people, and that it can confidently be expected that the improvement will be permanent now that the sluice gates have been completed, and the water will be let in regularly every rains."

9. I myself have just visited the villages to the centre and the south of this sub-division, and I fully corroborate both Mr. Pellew's and Mr. Dutt's statements. I found only two per cent. of the people suffering from the effects of former fevers, enlarged spleen, and anaemia. The patshallas were full of healthy boys, not one of whom had splenic enlargement. Cultivation was going on actively, and the people were eager to have increased water-supply and drainage.

10. In the villages along these dried-up watercourses the fever had raged with a truly terrible effect. It was not an endemic exacerbation, but the severest epidemic, and Mr. Pellew is quite right when he says that

"scarcely one-tenth of the people of these villages were left alive." This is a widely different result from that observed in the villages alongside the Hooghly. Here, though the fever was general and severe in the years in which it prevailed, yet it never approached that of the Kana villages in fatality, nor, when it subsided, did it disappear so entirely.

11. That there was an epidemic addition to the endemic fever in these riparian villages is evidenced from the progress of the disease downwards. From 1861 to 1864 it kept to the villages north of Hooghly town, declining in severity till 1869, when it affected most the villages as far down as Serampore. In 1872 the villages south of Serampore suffered most, and in 1875 to 1878 it came as far down as Bally. In 1879 it declined so markedly that both Mr. Dutt and myself found the disease about normal in the last affected villages, where I found about five per cent. suffering from the effects of former attacks. In all the other villages it is below what is normal and usual in the cold weather.

12. The European quarters of Hooghly and Serampore escaped the epidemic all through. Indeed the native inhabitants of these municipalities suffered and died to a less extent than those in the villages beyond the reach of municipal action. This was well and clearly marked. Both sides of the roads and the railways were indifferently affected, and are so still. The population affected was very dense and the drainage imperfect, but the worst feature is the drinking water. The river banks are fouled by squatters, and the numerous small tanks (all of them private, and most of them enclosed) have their margins loaded with kitchen and house refuse, sometimes also with cattle droppings. These tanks also receive all the roadside drainage and the overflowing of middens and cesspits, and they were often surrounded with dead and decaying shrub jungle, which invariably flourishes on a damp soil full of organic matter.

13. Notwithstanding the evident pollution of these tanks, the people are so accustomed to use them that when we got pure recondenced steam water from the mills and conducted it into several of the tanks in Serampore, they would not go 100 yards further for the purer supply.

14. In these villages the years of most rain are the most febrile, and when we consider that the water passes over and through so foul a soil into these tanks, and is used so freely by the people, we cannot wonder that it is so; nor are we to expect here the same immunity from the disease in the future as we have had, and hope to have, in those villages along the cross-country nuddis now replenished by good water in the manner above stated.

15. The Government is aware from this office letter No. 726S., dated the 23rd September last, that though I acknowledge the want of drainage to be an important factor in the causation of fever, I do not consider it to be the primary cause. I hold that the accumulating foulness of the surface soil is the thing acted on by the moisture. I need not note the arguments I submitted in the above quoted letter in support of this belief. That Europeans have not suffered, that native municipal residents have suffered less than others in these riparian villages, and that the bringing in of the purer Damuda water to replace the foul decomposing stuff that lay in chains of pools along these river beds, are but further proofs that it is not so much the more or less water in the soil as the filth which accumulates on the surface and gets washed into the tanks, and finds a ready entrance into the systems of the people, that we have to credit with the prevalence of the disease and mortality we are considering.

16. *Effects of the Dankuni Project.*—Regarding the directly beneficial effects of the Dankuni jheel drainage on the health of the people we are left in doubt. Statistics do not help us. There has been improvement everywhere, and an examination of Mr. Adley's list of villages shows that there was no extraordinary sickness in or around this jheel—that is in 1867 to 1869. Mr. Pellew's maps exhibit no sickness here from 1861 to 1873. Three of the villages noted by Mr. Adley on the north and two on the south had the fever somewhat severely, but even in them the cases were fewer and less severe than elsewhere. Again, at the same time that the fever increased in the riparian villages near Connagurh, it also increased in the Dankuni villages.

lying to the west of them—that is in 1875-76—though the jheel was drained in 1873. In the villages to the south and in the centre of this jheel the people acknowledged to me and the Assistant Surgeon that they have had little or no fever since that which prevailed after the cyclone of 1864. Among the youths who surrounded me in these villages I only found one per cent. with any enlargement of spleen of recent origin, and four per cent. of former years; none of the full-grown or old had any disease; cultivation was going on actively; boys were at school full of life and free from disease.

17. Mr. Carstairs, the Magistrate, was so good as to order the village panchaits to aid us by collecting the numbers of the deaths in the houses of six villages chosen from among the worst of the lot. A clerk went to each house accompanied by the chowkidars, and the names of all who died during the last six years were written out in detail. The numbers are subject to two fallacies: some who died before the six years referred to might have been entered, for the deaths that occurred during the past cyclone are still much thought of by the people, and some of the deaths might have been omitted from forgetfulness. They are, however, the best statistics we can get. The results are:—

Villages.				Death-rates.
Bengitti	...	...	...	22·4 per 1,000.
Makhla	...	...	...	26·0 "
Bohera	...	...	...	31·2 "
Mirgulla	...	...	...	31·2 "
Khorial	...	...	...	53·1 " ^{per 1,000}
Ramuni	...	...	...	59·4 " ^{per 1,000}

The last is a village yet surrounded by a shallow swamp, inhabited by goalahs with large numbers of cattle whose excreta lie in masses round every house. Khorial and Bohera are close to Connagurh, and suffered from fever rather from their insanitary conditions than specially from those of the Dankuni jheel. The people of Bengitti were loud in their demands to have a cut made from a swamp in the villages to the Dankuni canal, in order that it might be drained, and that they might get like crops from it as were now obtained in such abundance from the drained jheel lands in their neighbourhood.

18. It may be said that the drainage of so large an area as the Dankuni jheel would have a great effect on the subsoil moisture on the higher slopes around the basin. I once thought so, but more recently direct observation of the tanks and wells dug along the Hooghly have shown me that its mud or fine clay is too retentive of moisture to surrender it easily. The little ooze that does come out has an inappreciable effect in drying the neighbouring soil. It is widely different along the Damuda, the spill of which is sandy. In this sandy strata the subsoil percolation is rapid and considerable. At Mugra, where the Damuda and Hooghly deposits form separate strata showing different overflowings at different periods, depending on the excess of rain in Chota Nagpore or on the Himalayas, we find that the Hooghly clay stratum lets out little or no water, while in the sandy one it flows abundantly. Wells dug close to tanks, and even tanks being deepened at one end, while the other is full of water, get very little fluid by side percolation, and that very slowly. This might have been seen a few days ago when one end of the tank south of the Calcutta Cathedral was being deepened. These facts naturally led me to question the action of the subsoil moisture in regard to these diseases, and drove me to the conclusion that surface impurities had much more to do with the evil.

19. I may here observe that the "Sanitary Record" for January states that Professors Klebs of Prague and Tommasi of Rome, in examining the lower strata of the air of the Argo Romano and its soil, discovered "long, oval, shining microscopic spores with which animals were artificially infected with intermittent fever of the true marsh type, and that they showed precisely the same enlargement of the spleen as the human beings who caught the fever in the ordinary way." These gentlemen have published full particulars of the experiments made by them and the results obtained. I must again record my belief that we will surely find the true causes of both cholera and fever in

Bengal, but that they must be looked for by purely scientific men where these diseases most prevail.

20. About one point in regard to the Dankuni jheel there can be no doubt, that is, its success as a drainage scheme. Nothing can be more perfect or simple. The Hooghly tide water is kept out or let in and retained just as it suits the cultivators for ploughing, sowing, reaping or irrigating. The same holds good, but to a far greater degree, with regard to the benefits derived by giving purer water for drinking (as well as for irrigation) to the people of the villages along the river courses, and even along the Hooghly.

21. When inspecting Howrah I was asked whether Hooghly or the Damuda water would be more suitable for drinking purposes. I pointed at once to the brownish-yellow Hooghly water, so full of silt that it required enormous filter beds to clear it for use in Calcutta, and compared it with the clearer water of the Damuda. There is not a villager between the two rivers who does not prefer the Damuda water for drinking purposes, and natives are better able to discern pure water by its taste than we are.

22. Again, the cultivation that has replaced the swampy Dankuni is a noteworthy fact. I saw the rice three feet high, bearing grain so heavy that the stalks could not bear it, and that down to the edge of the central drain. I was told that the margins which formerly grew rice abundantly did not do so now, and that they were now useless for cultivation. This is not quite correct, for I saw that every portion of it was cultivated, though the same sort of rice is not now grown. The villagers acknowledged that formerly the same margin was at one season flooded and at another dry, in accordance with excess or scantiness of the rainfall, and that when the quantity of rain was as they wished it, a very flourishing crop was got from it; but that when the flood was in excess they could grow nothing, and when it was too little the marginal portion was as they are at present. They also acknowledged that were the Damuda water to flow all the year round through the Saraswati, and they could use this water for irrigation in the dry season, there would be no cause for complaint.

23. The Government is aware that the Salimabad sluice has a sand bank in front, and only works when the river is so high as to flow over this bank, and that the larger sluice, besides the Jujuti in Burdwan, is also banked up. Indeed it would be useless opening it at present, as the water would not be required till the cut is made joining the Banka with the Kana nuddi and Saraswati. Only when this excavation is completed will these streams be running the whole year round.

24. Considering the good done, the suffering prevented, and the lives saved by the water being let into these channels during, and for a short time after, the rains, we can only hope for better times and more money to complete the scheme, and render the benefits still greater in amount and more permanent in character.

25. I do not now look with the dismay and apprehension I formerly did on the continued embankments of our river systems which are liable to overflow, and to the destruction of villages and lands in the saucer-like interfluvial hollows. The Dankuni, Jujuti, and Selimabad projects show that the difficulty can be overcome, and that the higher river-beds can become the irrigators of the lower lands, and give a fresh and health-giving water-supply to villages, while they increase the flood-supply of the country and the wealth of the people, and permit these supplies to the cheaply boated away to larger markets to meet the wants of other communities.

26. The parts to be most benefited are those long and wide tracts of country still within tidal influence—the bheels, jheels, swamps, and samunders of Lower Bengal. The downcoming water and the upcoming tides, especially spring tides, and most so in the rains, fill to overflowing all these inland hollows within tidal range. The water pushed up and spread out during flood cannot get away out of the narrow khal or creek during ebb, that is, before the returning flood checks its exit and compels its retention. Mr. Whitfield's self-acting sluice (which can be fixed so as to remain shut or open at will) keeps out the higher floods, and yet lets out the inner accumulations, thus overcoming all difficulties and doing all the good above noted. The drainage and cultivation of large areas of Bengal and good water-supply to its people,

which were lately thought impossible, are now practicable, easy of execution, and not expensive, and our long and large riparian and littoral embankments cease to be a source of disease and even anxiety.

27. I have to apologise for the delay in submitting this report. My college duties chained me to Calcutta after my return from the eastern districts, and prevented me from making the necessary inquiries on the subject locally; then the house-to-house inquiry in the Serampore villages, and the consideration of reports on them, took up much time; and, lastly, I thought it right to visit the Rajapore jheel villages in Howrah, and also Midnapore, where also the fever prevailed, before finally closing the report.

No. 2225*I.*, dated Fort William, the 14th May 1880.

From—C. TAYLOR, Esq., Officiating Assistant Secretary to the Government of Bengal, Public Works Department, Irrigation Branch,

To—The Secretary to the Government of Bengal, General Department.

WITH reference to the Medical and Municipal Department's letters noted in *Sanitation.*
No. 32, dated 9th April 1880.
Nos. 11—32, dated 3rd May 1880.

the margin, requesting to submit a short memorandum showing what is now being done in regard to the Jujuti Scheme, I am directed to forward the accompanying copy, paragraphs 1 to 4, of letter No. 1359 of the 2nd ultimo, showing the order in which the works are proposed to be carried out so as to make them useful at the earliest possible date; and to say, that the Superintending Engineer's proposals have been approved by the Chief Engineer.

2. The following works have also been sanctioned for immediate execution at an estimated cost of Rs. 8,523, which will be included in the estimates for the Jujuti Project:—

- I.—Clearing silt from the bed of the channel on both sides of the Government sluice in the left bank embankment of the Damuda at Jujuti in the Burdwan district.
- II.—Clearing silt from the bed of the channel on both sides of the Government sluice in the left bank of the Damuda at Jamalpore at the head of the Kana nuddi in the Burdwan district with training works, &c., in the bed of the Damuda above the sluice.
- III.—Raising crest of the side banks of the Kana nuddi and Saraswati junction cut and repairing the weir at Gopalnagore in the Hooghly district.

3. The Superintending Engineer, South-Western Circle, has been requested to address the Chairman of the Burdwan Municipality on the subject of the supply channel referred to in paragraph 3 of his letter, explaining that it will greatly facilitate the construction of our works if they will excavate the channel at an early date.

4. I am to add that, as communicated to the Financial Department in this office No. 2123*I.-A.* of the 6th instant, Rs. 2½ lakhs have been placed by the Buildings and Roads Branch at the disposal of this Branch for expenditure on the works during 1880-81.

No. 1359, dated the 2nd April 1880.

From—J. C. VERTANNES, Esq., Superintending Engineer, South-Western Circle,
To—The Chief Engineer, Bengal, Irrigation Branch.

In accordance with the instructions contained in Joint-Secretary's letter No. 1457*I.* of the 18th ultimo, I have the honor to propose for your approval the following programme for the execution of the works connected with the Jujuti Scheme. The principal works remaining to be done are the following, viz.—

Section No. I.

1. Spurs in the Damuda.
2. Diversions or cuts off in the course of the Banka nullah.

Section No. II.

1. Earthwork of channel required to connect the Banka Nullah with the Kana nuddi.
2. Weir across the Banka nullah at Burdwan.
3. Head sluice at ditto ditto.

- 4. Road bridges at Burdwan.
- 5. Syphons.
- 6. Distributary weirs and other minor works.

Section No. III.

- 1. Syphon culverts.
- 2. Distributary weirs.

Section No. IV.

- 1. Bridges.
- 2. Distributary weirs.
- 3. Minor irrigation outlet, &c.

2. During the current official year I propose to proceed with the following works, viz.—

Section No. II.

	Probable expenditure. Rs.
Excavation of cut required to connect the Banka with the Kana nuddi, including cost of land to be taken up	1,20,000
Weir and head sluice on Banka nullah at Burdwan	50,000
Two bridges at Burdwan	25,000
One bridge on Mymaree road at Jamalpore	12,000
Distributary head sluices	8,000
Syphon culverts	10,000

Section No. III.

- Distributary weirs on the Kana Damuda

Total	2,50,000
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Section No. IV.

- Distributary weirs on the Kana nuddi and Saraswati

15,000

If more funds were available an additional sum of Rs. 50,000 could with advantage be expended during the current year on the taking up of the lands in the beds of the Kana nuddi, the Kana Damuda, and the Saraswati nuddees. Of the works enumerated above, I propose to begin at once with the excavation of the channel required to connect the Banka nuddi with the Kana nuddi and the construction of the two road bridges required at Burdwan. I at first intended to have also begun the weir and head sluice on the Banka nullah, but on a reconsideration I am of opinion to postpone the commencement of these two works till after the ensuing rains. By the time the site for the weir and head sluice has been settled and the land taken and the required materials and tools and plant collected, the rains will have set in, and we could then do little or no work. It will, I am of opinion, be better to defer the work till after the rains, say till next November. In the meantime the materials, &c., required can be collected at site. The construction of the weir should not take more than seven or eight months if we have all the materials required for it ready at site.

3. It is besides all probable that by November next the Burdwan Municipality might also have ready the supply channel proposed to be excavated by them for the filling of the tanks in the town. This will enable us to save the cost and trouble of the diversion cut which would otherwise have to be made near the site of weir, as we could not shut out the supply of water at present sent down the Banka nullah for the use of the town. The supply channel for the Burdwan stations proposed to be taken about a mile above the proposed site for the weir and by draining the Banka nullah at this place, we could lay dry its bed at the proposed weir site below it.

4. For reasons stated above I am therefore of opinion that it will be better to defer the weir and head sluice works till after the rains. The earth-work of the new channel, Section No. 2, connecting the Banka and Kana nuddi and the two bridges at Burdwan can be taken up at once, and I have directed the Executive Engineer to arrange for commencing at once with

If materials be available the two syphons in section No. 2 and the bridge at Jamalpore on the Mymaree road will also be begun

the works in question and also for collecting the materials required for the weir and head sluice on the Banka nullah and also for the bridge at Jamalpore and for the other masonry work

enumerated in paragraph 2 preceding.

* * *

Rainfall, Weather, and State and Prospects of the Crops.

Statement showing Rainfall, Weather, and State and Prospects of the Crops in the different Districts of Bengal, as reported to Government during the week ending the 12th June 1880.

No.	District, and date of return.	Rainfall at Sudder Station in inches.	Character of the weather, state and prospects of the crops, and state of health at date.
BENGAL			
<i>Western Districts.</i>			
Burdwan Divn.	1 Burdwan, June 12 '80	0·31	Weather—hot and oppressive. Prospects of crops good. Excepting few cholera cases, general health good.
	Cutwa ..	0·59	
	Culna ..	2·12	
	Raneeunge ..	7·84	
	2 Bankoora, " 12 ..	0·90	Weather—oppressively hot during early part of week. In Bankoora and Onda thanas, and Joypore, Taldangra and Burjora outposts, some <i>til</i> , cotton, sugarcane and early rice submerged and slightly damaged. In Teleshair outpost some rice could not be sown, and in Raipore some rice seed washed away, owing to late flood on 3rd and 4th current. Damage to bridges and old houses considerable.
	Bishenpore ..	0·77	
Presidency Divn.	3 Beerbohom, .. 12 ..	0·24	Weather—very hot. Clouds hanging about. This break of fine weather has facilitated ploughing, which last week's heavy rain checked in places. Prospects good. Sowing going on.
	4 Midnapore, .. 12 ..	Nil	Weather—sultry. State and prospects of crops generally favorable.
	5 Hooghly, .. 12 ..	0·05	Weather—seasonable. Sugarcane and jute promise well. <i>Aus</i> progressing favorably. <i>Amun</i> being transplanted. Public health good.
	Howrah .. 14 ..	2·12	Weather—showery. State and prospects of crops good.
	<i>Central Districts.</i>		
	6 24-Pergunnahs, June 12 '80	1·61	Weather—seasonable. Rice and jute sowings continue. Young plants promising. Rain in Bassirhat and Barripore excessive. Public health generally good.
Rashtrapati and Cooch Behar Divn.	7 Nuddea, .. 12 ..	0·47	Weather—during early part of week very rainy and cloudy. Last two or three days hot and sunshiny. Rainfall excessive at Kooshtea and Meherpore, and caused considerable damage to crops in low-lying lands. Everywhere rain has for a time stopped weeding. State of crops otherwise good.
	Kooshtea ..	9·60	
	Meherpore ..	12·85	
	Choodanga ..	4·30	
	Ranaghata ..	2·92	
	Bongong ..	5·40	
Dacca Divn.	8 Jessor, .. 12 ..	0·99	Weather—hot and cloudy. <i>Til</i> being harvested. Paddy transplanting commenced. Prospects good. Health good.
	Magoorah ..	4·82	
	Jhenidah ..	5·62	
	Narail ..	2·67	
	Khoolna ..	4·42	
	Bagirhat ..	3·23	
Rashtrapati and Cooch Behar Divn.	9 Moorshedabad, .. 12 ..	0·59	Weather—hot. Prospect of crops good. Public health generally good, except cases of fever in some thanas of Sudder.
	10 Dinagepore, June 11 '80	12·19	Heavy rain on four days, and general throughout district. Some damage caused to autumn rice in low plots. Harvest of <i>boro</i> rice begun.
	11 Rajshabye, .. 12 ..	0·34	Weather—hot and cloudy. Heavy rain in almost all thanas done some damage to standing crops. Ganges rising rapidly. Prospects of crops generally good. Public health continues good. Price of rice 15 to 20 seers per rupee.
	12 Rungpore, .. 11 ..	13·75	Weather—still rainy. State and prospect of crops continue very favorable. Public health good.
	Kurigram ..	17·18	
	Bagdogra ..	5·23	
Rashtrapati and Cooch Behar Divn.	13 Gaibanda ..	12·54	
	Bogra, .. 12 ..	2·21	Weather—hot and close. <i>Til</i> , <i>kaon</i> , <i>jali aus</i> , and jute being harvested; good outturn expected, though some injury was done to crops on low-lying lands by excessive rain. Sugarcane flourishing. Public health fairly good.
	14 Pubna, .. 12 ..	3·68	Rain almost every day. All crops flourishing. Indigo cutting commenced. Public health good. Rivers rising.
	15 Darjeeling, .. 12 ..	6·08	Rain every day during week. Crops both in Hills and Terai progressing favorably.
	16 Julpigoree, .. 12 ..	15·35	Incessant heavy rain done some damage to seedlings and retarded sowings. General health good, but small-pox still reported.
	Cooch Behar, .. 10 ..	27·45	With exception of a partial break on 7th, almost incessant rain, with occasional heavy thunder. No floods reported, but low lands all under water, and <i>aus</i> must of course suffer to a certain extent. <i>Kaon</i> and jute will also suffer. On the whole, however, much damage not done as yet by unusually heavy rain. Public health exceptionally good.
<i>Eastern Districts.</i>			
Dacca Divn.	17 Daces, June 12 '80	4·87	Weather—seasonable. State and prospects of crops promising. <i>Aus</i> and <i>til</i> being gathered. Public health good.
	Manickgunge (for week ending 9th June.)	4·00	
	Moonshigunge (for week ending 9th June.)	9·12	
	18 Furreedpore, .. 12 ..	0·47	Weather—variable. Occasional rains. <i>Til</i> slightly damaged by heavy rain. <i>Jali dhan</i> being reaped. Prospects of crops and public health good.
	Goalundo ..	4·49	
	Madaripore ..	1·74	
Dacca Divn.	19 Backergunge, .. 10 ..	6·24	Weather—cloudy and sultry. Heavy rain on two days. <i>Aus</i> injured in places by high tides, but prospects generally continue good.
	20 Mymensingh, .. 11 ..	8·97	Heavy rain during week. Rainy season appears to have set in. State and prospects of crops good as yet, but a little dry weather wanted. Autumn rice still young and of small growth, and fears entertained of its being submerged altogether, especially in Kishoregunge sub-division.
	Jamalpore ..	12·19	
	Attia ..	3·27	
	Kishoregunge ..	10·41	
	21 Tipperah, .. 11 ..	5·94	Copious rain during week with strong south and south-east winds. All crops promise well.
	Brahmubanbaria ..	10·71	
	Chandpore ..	2·88	

No.	District, and date of return.	Rainfall at Sudder Station in inches.	Character of the weather, state and prospects of the crops, and state of health at date.
BENGAL.—(Continued.)			
<i>Eastern Districts.—(Continued.)</i>			
CHITTAGONG DIVN.	22 Chittagong June 15 '80	3·60	Weather—cloudy, with showers for last two days. <i>Panica aus</i> being reaped. Transplantation of <i>aus</i> commenced in some places. Cholera not yet ceased.
	23 Noakhally, " 10 "	6·43	Weather—heavy rain, with intervals of oppressive heat, cooled by occasional wind. Rice growing fast. Rice fields deep in water.
	24 Chittagong Hill Tracts, " 8 "	7·23	Weather—cloudy and cool. A very heavy shower of rain, accompanied with squalls, on night of 7th. Cotton and paddy thriving. Indian-corn in flower on some jums. Prospects good.
	Hill Tipperah, " 9 "	5·78	Weather—rainy. Sowing of <i>satia</i> paddy still continues. Public health good.
BEHAR.			
PAKNA DIVN.	25 Patna, June 12 '80	0·4	Weather—hot and cloudy. Rain threatening. Sowing of <i>bhadoi</i> crops commenced in some places.
	Barrh ...	0·87	
	Behar ...	0·73	
	26 Gya, " 12 "	0·04	Weather—cloudy and hot. Maximum reading in shade reached as high as 113·4°. Sugarcane growing. Public health generally good.
	Aurungabad ...	0·07	
	Nowada ...	1·34	
	27 Shahabad, " 12 "	A little drizzling	Monsoon apparently arrived on 11th, and heavy rain expected immediately. Sugarcane promises well. Prices stationary. General health good.
	Durbhunga, " 12 "	2·08	Weather—cool and cloudy. Rain threatening. Sowing of <i>bhadoi</i> crops in progress. Outturn of <i>moong</i> good. Prices stationary. A few cases of cholera and small-pox still hanging about in Madhoobani. Some fever at head-quarters.
	29 Mozafferpore, " 12 "	0·50	Weather—cool and cloudy. Rice being sown and cultivation of lands being carried on.
	Hajeeapore ...	0·13	
BHAGUPORE DIVN.	30 Sarun, " 12 "	0·71	Weather—hot and cloudy. Rain falling this morning (12th). Prospects of crops favorable. Fresh outbreaks of cholera and small-pox in Sewan sub-division.
	31 Chumparun, " 12 "	0·01	Weather—cool, cloudy, with light showers; east wind. State and prospects of crops good. Indigo manufacture commenced.
	32 Monghyr, June 12 '80	0·17	Monsoon seems to have set in. Lands being prepared for <i>bhadai</i> and <i>aghani</i> sowings, and paddy sowings commenced in some parts
	Begooserai ...	1·56	
	Jamui ...	1·45	
	33 Bhagulpore, " 12 "	0·08	Weather—cloudy and sultry. Land being ploughed up and sown in all directions. Sugarcane germinated and growing luxuriantly. Indigo promises well. No other crop on ground.
	34 Purneah, " 12 "	3·14	Rain set in early. Constant showers from north and east. Damage from heavy rain and flood reported in one thana; other reports favorable.
	Arrareah ...	7·81	
	35 Maldah, " 12 "	2·54	Rain on 6th and 11th. Weather cloudy and hot. Prospects of <i>bhadoi</i> crops good. Common rice 17 seers a rupee. Mahanunda rising fast. Public health fair.
	36 Sonthal Perghs, " 12 "	1·50	Weather—rainy; seasonable. State and prospects of crops good.
ORISSA DIVN.	Jamtara ...	4·93	
	Rajmehal ...	4·36	
	Deoghor ...	4·47	
	Goda ...	0·12	
ORISSA.			
ORISSA DIVN.	37 Cuttack, June 12 '80	Nil	Weather—rather hot. Cloudy at intervals. Rice growing well. Prospects good. Cholera and cattle disease in parts of Kendrapara sub-division, and small-pox still prevalent. Common rice 16 $\frac{1}{2}$ to 20 seers per rupee.
	Jajpore ...	4·67	
	Kendrapara ...	4·3	
	38 Pooree, " 10 "	0·54	Weather—seasonable. Sowing of <i>sarud</i> rice going on rapidly. Miscellaneous crops promising well. Common rice 20 to 24 seers per rupee. Public health good.
CHOTA NAGPORE.	Khoorda ...	0·49	
	39 Balasore, " 11 "	1·06	Rain ceased about middle of week. Weather now fine and warm. Crops already sown not suffered much, but sowing in low lands suspended owing to heavy rain. Sowing going on on higher land, and if present fine weather continues all the land may be sown.
CHOTA NAGPORE.			
<i>South-West Frontier Agency.</i>			
40 Hazareebagh, June 11 '80	1·60	Weather—stormy and rainy, with occasional breaks of sunshine. Ploughing and sowing being carried on throughout district. General health good. Prices of food-grains cheap.	
41 Lohardugga, " 12 "	0·42	Weather—unsettled. Occasional showers. Sowings proceeding and prospects still favorable. Cases of small-pox and cholera reported; latter from Palamow chiefly.	
42 Singboom, " 11 "	2·11	Weather—variable. Very hot and oppressive during first part of week. A furious gale with heavy rain on 9th. Since then clouded and cool. Too much rain retarding broadcast sowings. General health good.	
43 Manboom, " 12 "	2·26	Weather—hot and oppressive till evening of 10th, when there was a storm with heavy rain. Cooler since rain. Field-work progressing actively in all directions. Public health generally good.	
Govindpore ...			
7·91			

Published for general information.

Results of the Meteorological Observations taken at the Alipore Observatory from
6th to 12th June 1880.

Month.	Date.	Maximum in sun.	Mean pressure barometer at 32° Fahr.	TEMPERATURE.				HYGROMETRY.				WIND.				Rain.	WATER	
				Mean.	Maximum.	Range.	Minimum.	Mean wet bulb.	Vapour tension.	Dew point.	Humidity.	Prevailing direction.	Miles recorded.					
1880.	June	6th	151·3	Inches 29·512	D	86·4	90·9	D	7·8	83·1	80·6	1·077	78·5	77	Chiefly S W.	332	Inches 0·07	Cloudy, o g d p.
"	"	7th	146·2	'515	87·1	91·2	7·9	83·3	84·0	1·129	83·0	88	Chiefly S W & S S W.	237	Nil	Cloudy.		
"	"	8th	113·4	'539	84·9	88·5	4·9	83·6	82·2	1·065	81·2	88	Till 7 A.M. S S W, till 8 A.M. E S E through S & S E, till 10·30 P.M. S S W through S E & S, till midnight S W by W.	146	0·01	Cloudy, o g p.		
"	"	9th	158·2	'557	84·1	91·9	15·9	76·0	81·2	1·028	80·1	88	Till 1 A.M. S W by W, till noon S W, back again through W, N, E & S, till midnight S S W.	111	0·23	Cloudy, o g t p.		
"	"	10th	152·5	'533	84·9	92·7	13·2	79·5	81·6	1·040	80·4	87	Till 7·30 A.M. S S W, till 9·30 A.M. W S W, till 3·45 P.M. S S W, till 9·15 P.M. E by N through S & S E, till midnight S through S E.	91	0·42	Cloudy, o g t p.		
"	"	11th	151·1	'523	86·0	92·0	12·0	80·0	81·6	1·019	79·8	82	Till 10 A.M. S, till 11·45 A.M. S E, till 4 P.M. E S E, till 5·30 P.M. S S E, till midnight S.	88	Nil	Cloudy.		
"	"	12th	158·4	'533	82·0	91·9	12·6	79·3	80·3	1·012	79·6	92	From 6 A.M. to 2 P.M. chiefly E, till 3 P.M. S E, till 5 P.M. N N E, through E & N E, till 7 P.M. E N E, till midnight S E through E.	59	0·42	Cloudy, o g t p.		

The mean pressure of the seven days	... ... ...	Inches.	29·580
The average pressure of the corresponding period for 24 years, S. G. Office	... ...	Inches.	29·568
The mean temperature of the seven days	... ...	Θ	85·1
The average temperature of the corresponding period for 24 years, S. G. Office	... ...	Θ	85·6
The extreme variation of temperature during the seven days	... ...	Θ	16·7
The maximum temperature during the seven days	... ...	Θ	92·7
The highest velocity of the wind in one hour during the seven days	... ...	Miles.	27
The highest pressure of the wind on one square foot during the seven days	... ...	lbs.	3
The mean relative humidity during the seven days	... ...	%	86
The average relative humidity of the corresponding period for 24 years, S. G. Office	... ...	%	79
The total fall of rain from 6th to 12th June 1880	... ...	Inches.	1·15
The average fall of the corresponding period for 24 years, S. G. Office	... ...	Inches.	2·52
The total fall from 1st January to 12th June 1880	... ...	Inches.	15·13
The average fall of the corresponding period for 24 years, S. G. Office	... ...	Inches.	13·30

The mean pressure, temperature, &c., are deduced from observations made at 6 h, 10 h, 16 h and 22 h, and from the traces of the barograph and thermograph.

The maximum and minimum temperatures are obtained from self-registering thermometers. All the thermometers are verified, and the readings have been corrected to a standard constructed and verified at the Kew Observatory. They are exposed under a thatched shed open at the sides, and are suspended four feet above the ground.

The barometer readings are corrected approximately to those of the standard Newman's No. 86, formerly at the Surveyor-General's Office.

The hygrometric elements are obtained from Tables III, IV, and V of the official tables computed in the Meteorological Office, and based on Regnault's modifications of August's formula.

The direction and movement of the wind are taken from the trace of a Beckley's anemograph.

The mouth of the rain-gauge is one foot above the ground.

o overcast, g gloomy, d drizzling, p passing temporary showers, t thunder.

METEOROLOGICAL OFFICE, INDIA,
The 12th June 1880.

JOHN ELIOT,
For Meteorological Reporter to the Government of India.

Report on the Fluctuations in Traffic on the Northern Bengal State Railway for the month of May 1880.

GENERAL REMARKS.

THIS month's working shows a marked increase in several important staples, food-grain, salt, tea, tobacco, and other goods, the net increase amounting to 67,882 maunds over and above the corresponding period last year. The falling off in the jute and railway material traffic is due to the causes pointed out in the last report.

Increases.

Food-grain Mds. 53,795

The total weight carried this month was 1,62,719 maunds against 1,08,924 maunds for the corresponding month last year, thus showing a steady increasing traffic in this staple.

Gunny bags Mds. 2,157

This increase is mainly due to the brisk traffic in food-grain, despatchers of this staple being obliged to obtain gunnies from Calcutta.

Piece-goods Mds. 342

This increase is a mere trade fluctuation.

Salt Mds. 20,728

As pointed out in previous report, the low rate quoted has caused the increase noted. The small inland rivers too being at this time of the year unnavigable, has forced despatchers to have recourse to the railway.

Sugar Mds. 182

There has been no appreciable increase in this article owing no doubt to the high prices still ruling in the Calcutta market.

Tea Mds. 7,218

This favorable increase is due to the beginning of the tea season, which has been earlier this year than usual.

Tobacco Mds. 18,841

The increase in this staple is steady. Last month the gross weight hauled was 21,429, against 21,755 during the month under review.

All other goods Mds. 7,712

This increase is due to development of traffic.

Decreases.

Ale Mds. 704

Heavy despatches in January will explain the reason of the falling off in this article.

Ginger Mds. 79

This decrease is so insignificant as not to be worth noting. It is chiefly due to the absence of all demand in the Calcutta market.

Jute Mds. 15,258

This decrease is explained in the general remarks of April's report.

Railway material Mds. 22,052

This falling off is due to the causes pointed out in previous reports.

Statement showing Increases and Decreases in maundage of Staples carried over the Line during the month of May 1880.

STAPLES.	1879.		1880.		Total for 1879.	Total for 1880.	Increase in 1880.	Decrease in 1880.
	Up.	Down.	Up.	Down.				
Ale	1,152		443	5	1,152	448		704
Food-grain	5,146	1,03,778	5,733	1,56,986	1,08,924	1,62,719	53,795	79
Ginger		235		156	235	156		
Gunny bags	1,805	1,038	3,612	1,388	2,843	5,000	2,157	
Jute	3	32,670	15	17,400	32,673	17,415		15,258
Piece-goods	9,827	75	10,070	174	9,902	10,244	342	22,052
Railway material	34,752	2,935	10,882	4,753	37,687	15,635		
Salt	19,188	186	40,023	79	19,374	40,102	20,728	
Sugar	1,052	104	2,227	11	2,056	2,258	182	
Tea		3,366		10,584	3,366	10,584	7,218	
Tobacco	74	7,840	2	21,753	7,914	21,755	18,841	
All other goods	28,858	5,091	26,827	14,834	33,940	41,661	7,712	
Total	1,02,757	1,57,318	99,834	2,28,123	2,60,075	3,37,957	67,882	

Saidpur, the 9th June 1880.

G. S. LEONARD, Offy. Traffic Superintendent.

Calcutta and South-Eastern State Railway.

Statement showing Increases and Decreases in maundage of Staples carried over the line during the month of May 1880, as compared with the corresponding period of May 1879.

STAPLES	1879.		1880.		1879.	1880.	Increase.	Decrease.
	Up.	Down.	Up.	Down.	Total.	Total.		
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
Firewood	28,335	67	43,578	100	28,403	43,678	15,276	.....
Hay	8,820	.....	6,480	.....	8,820	6,480	.....	2,340
Wooloo grass	2,640	.....	2,040	.....	2,640	2,040	.....	600
Straw	2,750	.....	1,440	.....	2,750	1,440	.....	1,310
Paddy	5,564	.....	2,363	.....	5,564	2,363	.....	1,201
Rice	25,930	.....	20,904	.....	28,930	29,904	974	.....
Building materials	.....	.....	1,684	.....	580	1,684	580	1,104
Gunny bags	.....	.....	322	.....	352	322	30	.....
Coal	.....	.....	1,795	.....	1,795	.....	.....	1,795
Sundries	150	774	15	981	924	996	72	.....
Total	75,189	4,642	85,700	2,013	70,831	87,773	16,352	8,430

The increase in firewood traffic is due to greater imports at Basra and Canning Ghât.

The decrease in hay, wooloo, and straw is due to less demands at selling stations.

The decrease in paddy is due to cultivators of the Port Canning Company's estates selling it to the rice mills, for which they were previously advanced.

The increase in rice is due to regular working of the rice mills.

The decrease in building materials is due to less repairs having been done to the rice-mills, &c.

The increase in gunny bags is trifling.

The decrease in coal is due to less demands at rice mills.

The increase in sundries is trifling.

Calcutta, the 8th June 1880.

R. G. MOOKERJEE, Manager.

Nalhati State Railway.

Statement showing Increases and Decreases in maundage of Staples carried over the line during the month of May 1880, as compared with the corresponding period of May 1879.

STAPLES	1879.		1880.		1879.	1880.	Increase.	Decrease.
	Up.	Down.	Up.	Down.	Total.	Total.		
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
Brass and bell-metal ware	550	59	117	200	609	517	.....	292
Coal	2,403	.....	1,330	.....	2,403	1,330	.....	1,073
Cotton	92	.....	488	.....	92	488	396	.....
Edible grains	537	12,814	2,862	599	13,551	3,461	.....	9,890
Gunny	175	.....	58	.....	175	58	.....	117
Jaggree and sugar	393	.....	903	.....	393	903	510	.....
Piece-goods	1,760	.....	1,593	.....	1,760	1,593	.....	167
Silk and silk-cloth	.....	1,680	.....	1,221	1,680	1,221	.....	459
Seeds of all sorts	1,955	.....	957	.....	1,955	957	.....	998
Sundries	8,532	2,666	3,603	2,279	10,538	5,882	.....	4,656
Wine and beer	199	.....	167	.....	199	167	68	.....
Total	16,496	16,559	12,078	4,299	33,955	16,377	974	17,652

The decrease in brass and bell-metal ware is due to less import for want of demands.

The decrease in coal is due to less import for brick-burning coming to a close.

The increase in cotton is due to greater import for greater demands.

The decrease in edible grains is due to less import and export for want of demands.

The decrease in gunny is trifling.

The increase in jaggree and sugar is due to greater import for greater demands.

The decrease in piece-goods is due to less import for want of demands.

The decrease in silk and silk cloth is due to less export.

The decrease in seeds of all sorts is due to less import for want of demands.

The decrease in sundries is due to less import for want of demands.

The increase in wine and beer is trifling.

Calcutta, the 8th June 1880.

R. G. MOOKERJEE, Manager.

Weekly Return of Traffic Receipts on Indian Railways.

EAST INDIAN RAILWAY.

Approximate Return of Traffic for week ended 5th June 1880 on 1,507½ miles open.

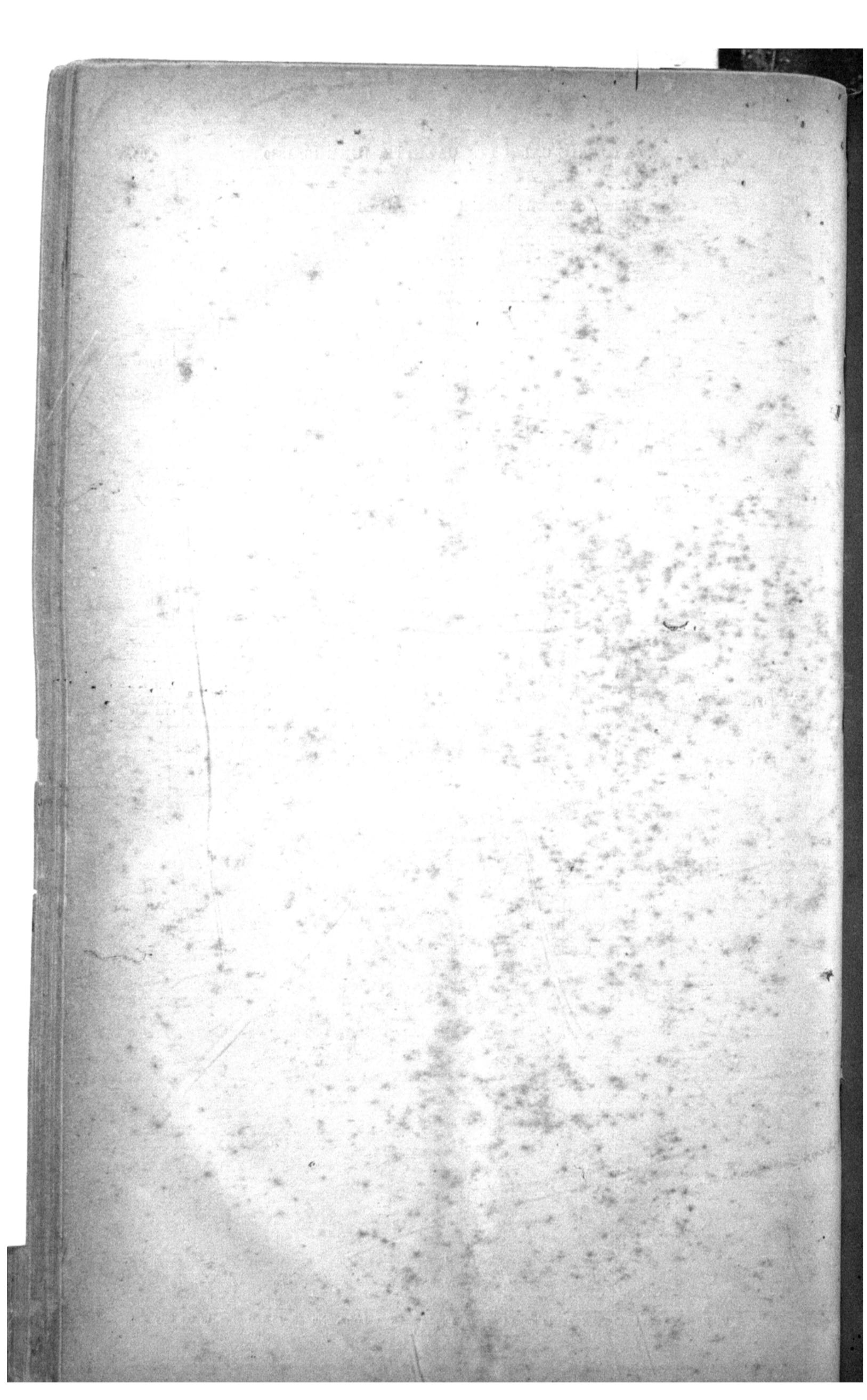
	COACHING TRAFFIC.			MERCHANTISE AND MINERAL TRAFFIC.			TOTAL TRAFFIC RECEIPTS.	TRAIN MILES RUN.			
	No. of passengers.	Coaching receipts.		Weight carried.	Receipts.			Coach-ing.	Merchan-dise.	Total.	
		Rs. A. P.	E s. d.	Mds. s.	Rs. A. P.	E s. d.					
Total traffic for the week ...	151,460	1,06,207 9 9	17,710 13 11	11,58,155 0	4,54,504 12 3	416,632 18 9	6,47,712 6 6	41,936	99,070	142,026	
Or per mile of railway ...	128 2 11	11. 15 0		... 301 8 9	27 12 10		429 11 8	....	....	....
For previous 21 weeks of half-year ...	3,481,495	48,04,553 4 9	448,667 7 0	3,13,00,557 30	1,32,47,902 11 11	1,214,391 1 8 1,81,42,456 0 8	1,029,626	2,379,449	3,409,075		
Total for 22 weeks ...	3,632,964	50,87,760 14 6	466,378 1 8	3,24,58,742 30	1,37,02,467 8 2	1,256,054 0 5	1,87,90,168 6 8	1,071,563	2,479,148	3,530,711	
COMPARISON.											
Total for corresponding week of previous year ...	169,737	1,80,750 5 9	16,568 15 7	14,26,998 0	6,10,900 11 6	56,000 1 2	7,91,660 1 3	62,620	124,247	176,987	
Per mile of railway, corresponding week of previous year ...	.....	119 14 9	10 10 10	.....	405 5 0	37 3 1	525 3 9	....	....	....
Total to corresponding date of previous year ...	3,679,894	52,49,924 7 8	481,243 1 6	3,50,97,635 30	1,49,47,327 9 4	1,370,171 13 11	2,01,97,252 0 7	1,189,889	2,832,232	4,022,121	

BENGAL PROVINCIAL RAILWAYS.

Weekly Statement of Traffic Receipts.

No. 17.

Latest return received.	Name of Railway.	Length open.	RECEIPTS FOR WEEK ENDING		TOTAL RECEIPTS FROM 1ST JANUARY		Total increase in 1880.	Total decrease in 1880.
			3rd May 1879.	1st May 1880.	To 3rd May 1879.	To 1st May 1880.		
1880.		Miles.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1st May ...	Northern Bengal ...	230	22,620 0 0	32,669 0 0	3,62,260 0 0	5,00,508 0 0	1,38,248 0 0	....
1st do. +	Tirhoot ...	82	9,174 0 0	10,672 0 0	1,72,472 0 0	1,88,925 0 0	16,453 0 0	....
2nd do.	Calcutta and South-Eastern ...	28	3,183 0 0	2,166 0 0	48,062 0 0	45,930 0 0	....	2,732 0 0
1st do. ...	Nalhati ...	27	1,750 0 0	1,386 0 0	31,698 0 0	27,712 0 0	....	5,986 0 0
8th do. ...	Patna and Gya ...	57	2,839 0 0	9,855 0 0	4,388 0 0	1,63,353 0 0	1,63,971 0 0	....
	Total ...	424	38,972 0 0	56,748 0 0	6,19,480 0 0	9,26,434 0 0	3,13,672 0 0	6,718 0 0





SUPPLEMENT TO

The Calcutta Gazette.

WEDNESDAY, JUNE 23, 1880.

OFFICIAL PAPERS.

Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on payment of Six Rupees per annum if delivered in Calcutta, or Twelve Rupees if sent by Post.

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RETURNS OF JOINT STOCK COMPANIES FOR THE YEAR 1879-80.

No. I.

Statement showing the name and number in the register borne by each of the Joint Stock Companies registered during the year ending 31st March 1880, with its object, nominal capital, and date of registration.

Number of this list.	Number borne by each Company in the general register.	Name of each Company.	Object of each Company.	Date of registration of each Company.	Nominal capital of each Company.
					Rs.
1	385	Mungha Tea Co., Ltd.	Cultivating and manufacturing tea ...	10th April	1,50,000
2	386	Darjeeling Steam Tramway Co., Ltd.	Constructing, maintaining, and working a steam tramway from Siliguri to Darjeeling.	10th "	14,00,000
3	388	Rytagool Tea Co., Ltd.	Cultivating and manufacturing tea, tobacco, cotton, and other produce.	26th May	55,000
4	389	Jamalpore Ice Manufacturing Co., Ltd.	Manufacturing ice by machinery ...	28th "	10,000
5	390	Julipgorjee Tea Co., Ltd.	Cultivating and manufacturing tea ...	29th "	50,000
6	391	Kackuarah Lime Factory Co., Ltd.	Manufacturing lime ...	6th June	10,000
7	392	Washabaree Tea Co., Ltd.	Cultivating and manufacturing tea ...	8th August	1,50,000
8	393	Indian Portland Cement Co., Ltd.	Manufacturing Portland and other cements and hydraulic and other lime.	18th "	2,00,000
9	394	Tondoo Tea Co., Ltd.	Cultivating and manufacturing tea ...	19th September	64,000
10	395	Bengal Banking Corporation, Ltd.	To carry on business of a banking institution in India.	4th February 1880	20,00,000
11	396	Tellichapore Tea Co., Ltd.	Cultivating and manufacturing tea ...	5th "	50,000
12	397	Kurniafulli Association, Ltd.	Ditto ditto	5th "	2,50,000
13	398	Nahartoli Tea Co., Ltd.	Ditto ditto	13th "	1,60,000
14	399	Hindu Union Bank, Ltd.	To carry on banking business	26th "	20,000
15	400	Hajian Tea Association, Ltd.	Cultivating and manufacturing tea ...	5th March	70,000
16	401	Dacca Loan Office, Ltd.	To carry on the business of lending money.	29th "	20,000
Total					
46,39,000					

No. II.

Statement showing the register numbers and names of Companies that have increased their capital during the year ending 31st March 1880.

Number of this list.	Register number borne by each Company.	Date of original registration.	Amount of original capital.	Names of Companies.	Date of increase.	Amount of increased capital.
			Rs.			Rs.
1	22	23rd September 1858	29,00,000	India General Steam Navigation Co., Ltd. ...	2nd October 1879	4,00,000
2	333	12th April 1876	40,000	Jessore Loan Co., Ltd. ...	3rd July	40,000
3	348	5th January 1877	55,000	Dam-Dim Tea Co., Ltd. ...	21st January 1880	11,000
4	376	2nd May "	1,06,000	Good Hope Tea Co., Ltd. ...	23rd March	15,000
5	367	9th July 1878	1,10,000	Bengal Ice Manufacturing Co., Ltd. ...	15th November 1879	1,10,000
						5,76,000

No. III.

Statement showing the register number and names of Companies that have commenced winding up have been finally dissolved, or are otherwise defunct, with their capital, dates of registration, winding up or final dissolution, during the year ending 31st March 1880.

Number of this list.	Number borne by each Company in the Register.	NAMES OF COMPANIES.	Nominal capital.	Date of registration.	Date of winding up.	Date of final dissolution.	Date on which written off as defunct.	Amount of liabilities as per last balance sheet.
			Rs.					Rs.
1	226	Kurseong and Terai Tea Co., Ltd.	1,00,000	8th February 1872	12th March 1880 ...	.....	.....	1,07,066
2	371	Suddea Tea Co., Ltd. (New.)	1,23,000	13th September 1878	4th November 1879	.....	.....	.....
3	332	Bengal Native Joint Stock Co., Ltd.	10,000	18th March 1876 ...	14th December "	.....	.....	.....
4	315	River and Coasting Steam Navigation Co., Ltd.	4,50,000	5th April 1875 ...	21st May "	.....	.....	1,06,932
5	325	Rustomjee Twine and Canvass Factory Co., Ltd.	8,00,000	13th August 1875 ...	8th November "	.....	.....	86,280
6	297	Bengal Iron Works Co., Ltd.	10,00,000	30th September 1874	21st April "	.....	.....	1,15,754
7	217	Eastern Steam Tug Co., Ltd.	3,00,000	6th December 1867	9th May "	.....	.....	47,954
		<i>Finally dissolved.</i>						
8	286	Chitpore Hydraulic Pressing Co., Ltd.	4,00,000	24th June 1874 ...	16th January 1879	10th July 1879	.....	.....
9	346	Joseph and Sons, Ltd. ...	20,000	7th September 1876	9th March 1878 ...	9th May "	.....	.....
10	178	Assam Trading Co., Ltd. ...	1,00,000	18th March 1865 ...	3rd November 1868	12th September "	.....	.....
		<i>Defunct.</i>						
11	335	Bengal Chemical Works, Ltd.	50,000	24th June 1876 ...	.....	.....	14th January 1880	.....
12	366	Theatre Royal Co., Ltd. ...	35,000	29th April 1878 ...	.....	.....	29th February "	.....

No. IV.

Statement showing the register numbers and names of literary, scientific, and charitable societies registered under Act XXI of 1860 during the year ending 31st March 1880.

Number of this list.	Number of register borne by each society.	Name of Society.	Date of registration.	Object for which registered.	REMARKS.
1	897	Dalhousie Institute, ...	5th May 1879 ...	To promote the literary, scientific, and social improvement of all classes of the community.	

No. VI.

Statement showing in order of registration the numbers and names of Joint Stock Companies on the Register on the 31st March 1880, with their nominal and paid up capital and their profit or loss as per balance sheets received, and date of such balance sheets.

Number of this list.	Number of registered firms by each Company.	NAMES OF COMPANIES.	Date of registration.	Nominal capital.	Paid up capital.	PROFIT OR LOSS AS PER LAST BALANCE SHEET FILED.		Date of last balance sheet filed.
						Profit.	Loss.	
1	2	3	4	5	6	7	8	9
				Rs.	Rs.	Rs.	Rs.	
1	20	Bengal Coal Co., Ld.	24th July 1853	22,00,000	22,00,000	2,36,581	.....	31st Oct. 1879
2	22	India General Steam Navigation Co., Ld.	24th Sept. "	33,00,000	32,68,233	2,45,750	.....	31st Dec. "
3	24	Bengal Uncovenanted Service Medical Hall Association, Ld.	8th Dec. "	50,000	25,949	.....	198	31st .. 1878
4	39	Bengal Tea Co., Ld.	23rd Nov. 1859	10,00,000	9,48,529	11,521	.....	31st .. 1879
5	40	Balsun Tea Co., Ld.	21st Feb. 1860	2,00,000	2,00,000	18,355	.....	31st .. 1878
6	46	Calcutta Docking Co., Ld.	4th Sept. "	12,18,000	12,18,000	1,43,323	.....	31st .. 1879
7	63	East India Tea Co., Ld.	7th Aug. 1861	10,00,000	10,00,000	.....	6,770	31st .. 1878
8	67	Kunchunpur Tea Co., Ld.	13th Nov. "	5,00,000	4,56,000	.....	12,212	31st .. 1879
9	68	Sylhet Tea Co., Ld.	18th Dec. "	1,50,000	1,49,633	24,766	.....	1st Jan. 1880
10	73	Great Eastern Hotel, Wine and General Purveying Co., Ld.	28th Feb. 1862	15,00,000	14,98,500	1,21,952	.....	28th Feb. 1879
11	78	Ramgurh Co., Ld.	15th May 1862	10,00,000	4,25,000	.....	2,455	31st Dec. "
12	81	Snoom Tea Co., Ld.	26th Nov. "	3,00,000	3,00,000	16,351	.....	31st .. 1878
13	86	Pankhabaree Tea Co., Ld.	9th Mar. 1863	2,50,000	2,18,342	6,400	.....	31st .. "
14	89	Dehradoon Tea Co., Ld.	31st " 1863	20,00,000	8,78,000	61,519	.....	31st Mar. "
15	90	R. Scott, Thompson and Co., Ld.	1st April 1863	5,00,000	4,67,650	15,724	.....	31st Dec. "
16	100	Central Cachar Tea Co., Ld.	2nd May "	10,00,000	10,00,000	6,810	.....	31st Dec. "
17	103	Bishnath Tea Co., Ld.	6th "	11,00,000	8,25,000	58,068	.....	31st .. "
18	105	Muttuck Tea Co., Ld.	26th "	4,00,000	3,02,275	10,762	.....	31st .. "
19	111	Patna Cachar Tea Co., Ld.	15th July "	7,00,000	7,00,000	19,331	.....	31st .. "
20	112	Equitable Coal Co., Ld.	1st Aug. "	8,00,000	8,00,000	1,17,556	.....	31st .. "
21	114	Calcutta Landing and Shipping Co., Ld.	7th "	3,00,000	2,20,000	17,899	.....	30th April "
22	120	Howrah Docking Co., Ld.	15th Sept. "	8,00,000	8,00,000	10,557	.....	31st Dec. 1878
23	124	Jellalpore Cachar Tea Co., Ld.	24th "	1,60,000	1,60,000	3,269	.....	31st .. 1879
24	128	Geosery Cotton Mills Co., Ld.	9th Oct. "	10,00,000	10,00,000	97,813	.....	31st .. "
25	137	Kurseong and Darjeeling Tea Co., Ld.	12th Dec. "	8,00,000	6,54,300	5,400	.....	31st Oct. "
26	139	Durrung Tea Co., Ld.	4th Jan. 1864	5,00,000	4,66,750	24,752	.....	31st Dec. "
27	140	Monacheria Tea Co., Ld.	30th "	8,00,000	7,29,150	6,274	.....	31st .. "
28	144	Tukvar Co., Ld.	20th Feb. "	12,00,000	7,34,380	44,776	.....	31st .. "
29	158	Moran Tea Co., Ld.	20th July "	6,00,000	4,80,000	29,147	.....	31st .. 1878
30	182	Calcutta Central Press Co., Ld.	21st April 1865	75,000	70,799	6,635	.....	30th April 1879
31	201	Durrabhar Co., Ld.	25th " 1866	60,000	60,000	15,524	.....	30th Nov. "
32	203	Burmah Steam Tug Co., Ld.	12th July "	3,00,000	1,89,000	66,593	.....	30th April ..
33	207	Kuttal Tea Co., Ld.	24th Jan. 1867	1,00,000	1,00,000	15,866	.....	31st Dec. ..
34	212	Chundypore Tea Co., Ld.	8th Aug. "	2,50,000	2,50,000	.....	6,788	31st .. "
35	213	Nasmyth's Patent Press Co., Ld.	16th Sept. "	3,20,000	3,20,000	34,759	.....	31st .. "
36	215	Darjeeling Terai Tea Co., Ld.	28th Oct. "	1,00,000	1,00,000	11,549	.....	31st .. 1878
37	216	Calcutta Opera House Co., Ld.	11th Nov. "	40,000	40,000	3,933	.....	31st .. 1879
38	218	New Mutual Tea Co., Ld.	15th Aug. 1868	1,20,000	1,17,750	3,976	.....	31st .. "
39	220	Arctiopore Tea Co., Ld.	19th Jan. 1869	3,00,000	3,00,000	34,111	.....	31st .. "
40	221	Hong-Kong and Shanghai Banking Corporation.	7th April "	1,12,50,000	1,12,50,000	7,17,483	.....	31st .. "
41	224	Nutwanpore Tea Co., Ld.	8th Jan. 1870	4,00,000	4,00,000	.....	15,590	31st .. "
42	225	Faridpore Loan Office, Ld.	13th June "	20,00,000	18,100	.....	12th April ..	
43	226	Tipperah ditto	25th Mar. 1871	1,00,000	84,140	7,239	.....	12th .. "
44	227	Cuttack Tea Co., Ld.	30th May "	2,70,000	2,50,000	12,632	.....	31st Dec. ..
45	228	Adalipore Terai Tea Co., Ld.	5th June "	1,10,000	7,845	.....	31st .. 1878	
46	233	Sinsail Tea Co., Ld.	15th Nov. "	6,25,000	6,25,000	84,871	.....	31st .. 1879
47	234	Indian Terai Tea Co., Ld.	4th Dec. "	1,50,000	1,50,000	.....	936	31st .. "
48	235	Majagram Tea Co., Ld.	27th Jan. 1872	2,00,000	1,75,000	3,872	.....	31st .. "
49	236	Hoolungoorie Tea Co., Ld.	25th Mar. "	4,00,000	4,00,000	15,987	.....	31st .. "
50	238	Central Terai Tea Co., Ld.	4th April "	4,00,000	4,00,000	20,434	.....	31st .. 1878
51	242	Bessai and Purbuttin Tea Co., Ld.	15th July "	1,80,000	1,80,000	10,418	.....	31st .. 1879
52	243	Chitpore Screw Co., Ld.	29th "	75,000	75,000	196	.....	31st Aug. ..
53	244	Bowresh Cotton Mills Co., Ld.	7th Aug. "	18,00,000	18,00,000	.....	17,081	31st Dec. 1878
54	245	Borsilah Tea Co., Ld.	24th Sept. "	1,10,000	1,10,000	.....	17,081	31st Dec. 1878
55	248	JKoi (Assam) Tea Co., Ld.	15th Nov. "	3,00,000	3,00,000	13,365	.....	31st .. "
56	249	Cochlear Tea Co., Ld.	17th Jan. 1873	3,00,000	2,44,673	5,070	.....	31st .. "
57	250	Assensole East Indian Railway Co-operative Society, Ld.	18th Feb. "	10,000	10,000	670	.....	31st .. 1879
58	251	Holts Tea Co., Ld.	27th "	3,50,000	3,50,000	9,082	.....	31st .. "
59	255	Raneegeune Coal Association, Ld.	8th April "	9,00,000	8,25,000	94,138	.....	31st Mar. ..
60	256	Dedurkosh Tea Co., Ld.	9th "	1,00,000	94,249	5,844	.....	31st Dec. ..
61	257	Calcutta Hydraulic Press Co., Ld.	10th "	1,70,000	1,70,000	23,258	.....	31st .. "
62	259	Budge-Budge Jute Mills Co., Ld.	21st "	18,00,000	14,40,000	58,611	.....	30th April ..
63	260	Gowhatti Tea Co., Ld.	2nd May "	4,00,000	4,00,000	5,782	.....	31st Dec. ..
64	261	Fort Gloster Jute Manufacturing Co., Ld.	6th "	14,00,000	14,00,000	61,385	.....	30th Nov. ..
65	262	New Beerbhoor Coal Co., Ld.	16th "	7,20,000	7,20,000	50,456	.....	31st Oct. ..
66	263	Buxar Co-operative Society, Ld.	25th "	4,000	3,300	1,393	.....	31st Dec. ..
67	265	Kalacherra Tea Co., Ld.	23rd July "	9,75,000	9,75,000	19,123	.....	31st .. "
68	266	Colonial Tea Co., Ld.	24th "	3,00,000	3,00,000	8,070	.....	31st .. "
69	267	Amitic Tea Co., Ld.	1st Sept. "	3,00,000	3,00,000	1,007	.....	31st .. "
70	268	Mymensingh Loan Office, Ld.	23rd "	50,000	50,590	8,000	.....	12th April ..
71	269	Labor Transport Co., Ld.	28th Oct. "	1,60,000	44,660	3,130	.....	31st Aug. ..
72	270	Burrisal Loan Office, Ld.	17th Nov. "	20,000	18,000	6,351	.....	14th Mar. ..
73	271	Singburi and Murmoh Tea Co., Ld.	26th "	4,00,000	2,96,560	4,075	.....	31st Dec. 1878
74	272	Seelapore Juic Manufacturing Co., Ld.	1st Dec. "	15,00,000	15,00,000	1,096	.....	31st .. 1879
75	274	Agricultural Phosphates Co., Ld.	18th "	1,00,000	85,000	.....	24,522	31st .. "
76	276	Puttareah Tea Co., Ld.	31st "	2,00,000	2,00,000	13,483	.....	31st .. "
77	277	Merchants Steam Tug Co., Ld.	3rd Jan. 1874	2,30,000	2,20,000	35,788	.....	31st .. "
78	278	Springside Tea Co., Ld.	10th "	1,68,000	1,68,000	77	.....	31st .. "
79	279	New Faldodhi Tea Co., Ld.	16th Feb. "	2,00,000	2,00,000	10,720	.....	31st .. 1878
80	280	Watson's Patent Press Co., Ld.	25th "	3,00,000	3,00,000	32,444	.....	31st .. 1879
81	281	The Mothoin Co., Ld.	5th "	1,50,000	1,38,000	.....	32,031	31st .. "
82	282	Ramkrishnapore Press Co., Ld.	23rd April "	1,30,000	1,30,000	4,083	.....	30th Sept. ..
83	285	Oriental Jute Manufacturing Co., Ld.	10th June "	19,00,000	19,00,000	2,21,171	.....	31st Dec. ..
84	287	Riverside Press Co. (Watson's Patent), Ld.	13th July "	3,00,000	2,70,000	3,098	.....	30th June ..

No. VI—concluded.

Number of this list.	Number of regis- ter borne by each Company.	NAMES OF COMPANIES.	Date of regis- tration.	Nominal capital.	Paid up capital.	PROFIT OR LOSS AS PER LAST BALANCE SHEET FILED.		Date of last balance sheet filed.
						Profit.	Loss.	
1	2	3	4	5	6	7	8	9
				Rs.	Rs.	Rs.	Rs.	
85	288	Howrah Mills Co., Ltd.	14th July 1874	14,00,000	14,00,000	42,000	....	31st Dec. 1879
86	290	The Strand Bank Press (Watson's Patent), Ltd.	24th " "	2,50,000	2,50,000	10,000	....	31st Jan. 1880
87	291	Teendarooth Co., Ltd.	28th " "	1,35,000	1,35,000	5,491	....	31st Dec. 1879
88	292	Joroktoolee Tea Co., Ltd.	7th Aug. "	80,000	80,000	....	30,537	31st " "
89	293	Burkholla Tea Co., Ltd.	1st Sept. "	2,70,000	2,70,000	20,700	....	31st " "
90	294	Tengling Tea Co., Ltd.	15th " "	1,50,000	97,300	....	....	31st " 1878
91	295	Baree Tea Co., Ltd.	23rd " "	1,50,000	1,50,000	645	....	31st Oct. 1879
92	296	Asiatic Jute Co., Ltd.	30th " "	4,00,000	3,99,900	....	10,033	31st Dec. 1879
93	298	Jheersaghat Tea Co., Ltd.	6th Oct. "	2,20,000	2,20,000	924	....	31st " "
94	300	Phoenix Tea Co. of Cachar, Ltd.	9th " "	6,00,000	5,10,000	41,199	....	31st Dec. " "
95	301	Bogra Loan Office, Ltd.	5th Nov. "	20,000	9,120	1,681	....	12th April " "
96	302	Sunzoo River Tea Co., Ltd.	13th " "	2,00,000	2,00,000	12,387	....	31st Dec. " "
97	304	Chota Nagpore Tea Co., Ltd.	27th " "	2,50,000	2,50,000	9,219	....	31st " "
98	306	Lacktaoorah Tea Co., Ltd.	5th Dec. "	2,25,000	2,25,000	....	278	31st " "
99	307	Dunbar Cotton Mills, Ltd.	18th " "	10,00,000	8,50,000	35,960	....	31st " "
100	308	Medla Tea Co., Ltd.	11th Jan. 1875	1,50,000	1,50,000	....	57,219	31st " "
101	311	Second Mutual Tea Co., Ltd.	26th Feb. "	2,55,500	1,97,048	....	....	31st " "
102	312	Mim Tea Co., Ltd.	6th Mar. "	1,60,000	1,59,000	....	13,546	31st " "
103	313	Giele Tea Co., Ltd.	20th " "	5,00,000	4,60,000	15,182	....	31st " 1878
104	314	Hoolmearree Tea Co., Ltd.	25th " "	1,20,000	1,20,000	11,476	....	31st " 1879
105	316	Sapakati Tea Co., Ltd.	1st May "	88,000	88,000	....	2,343	31st " 1878
106	317	Rajabaree Tea Co., Ltd.	5th " "	2,00,000	2,00,000	....	2,713	31st " 1879
107	319	Carew and Co., Ltd.	11th June "	16,00,000	16,00,000	70,910	....	31st " "
108	320	Burrakar Coal Co., Ltd.	19th " "	1,50,000	1,50,000	....	20,865	31st " "
109	321	Grab Tea Co., Ltd.	21st " "	6,00,000	5,60,000	....	1,61,799	31st " "
110	322	Sylhet Cultivating Co., Ltd.	29th " "	20,000	6,175	214	....	29th Feb. 1880
111	323	Mohanuddy Tea Co., Ltd.	12th July "	1,00,000	1,00,000	....	....	31st Dec. 1879
112	324	Deosari Tea Co., Ltd.	4th Aug. "	1,50,000	88,027	....	9,561	31st " 1878
113	325	Nasirabad Loan Office, Ltd.	26th Sept. "	20,000	15,300	1,293	....	12th April 1879
114	329	Panbaree and Koorkooreah Tea Co., Ltd.	14th Jan. 1876	1,50,000	1,50,000	....	2,187	31st Dec. " "
115	330	North-Western Cachar Tea Co., Ltd.	25th Feb. "	2,76,000	2,75,000	....	55,230	31st " "
116	331	Kungli Kungliot Tea Co., Ltd.	21st Feb. "	1,12,000	1,12,000	....	....	31st " 1878
117	333	Jessore Loan Co., Ltd.	12th April "	80,000	39,380	2,476	....	12th April 1879
118	334	Gourypore Co., Ltd.	12th " "	12,00,000	12,00,000	16,099	....	31st Dec. " "
119	336	Sahar Serpur Loan Office, Ltd.	28th June "	20,000	11,676	932	....	12th April " "
120	337	Jamalpore Trading Co., Ltd.	28th " "	50,000	5,650	257	....	15th Nov. " "
121	338	Narayanganje Trading Co., Ltd.	26th " "	20,000	10,172	1,677	....	11th Feb. " "
122	339	Rajmahal Stone Co., Ltd.	30th " "	2,50,000	2,50,000	11,545	....	31st Dec. " "
123	341	Amlikia Tea Co., Ltd.	25th July "	3,75,000	3,75,000	13,673	....	31st " "
124	342	Moonsheegunge Loan Office, Ltd.	29th " "	20,000	8,210	2,201	....	13th Jan. 1880
125	343	Mymensingh Great Eastern Bengal Exchange Co., Ltd.	23rd Aug. "	20,000	2,402	289	....	30th April 1879
126	344	Deshia Bastru Bybasayi Co., Ltd.	28th " "	10,000	3,762	1,342	....	12th Dec. " "
127	345	Cachar Native Joint Stock Co., Ltd.	31st " "	1,60,000	50,574	....	....	31st Dec. " "
128	347	Teesta Valley Tea Co., Ltd.	20th Nov. "	3,50,000	3,20,000	....	7,621	31st " 1878
129	348	Dam-Dim Tea Co., Ltd.	5th Jan. 1877	66,000	64,100	....	....	31st " 1879
130	349	Dening Co., Ltd.	5th " "	10,00,000	8,93,475	23,574	....	31st " 1878
131	350	Sona Tea Co., Ltd.	23rd " "	1,60,000	1,60,000	....	....	31st " 1878
132	352	Dhunsiri Tea Co., Ltd.	23rd Mar. "	1,60,000	98,000	....	....	31st " 1878
133	353	East Bengal Mercantile Co., Ltd.	10th April "	20,000	1,155	69	....	12th April 1879
134	354	Empress of India Cotton Mills Co., Ltd.	19th " "	6,25,000	4,65,833	85,835	....	31st Dec. " "
135	356	Good Hope Tea Co., Ltd.	2nd May "	1,15,000	96,500	....	....	31st " "
136	357	Cinnatoliish Tea Co., Ltd.	14th " "	2,50,000	2,50,000	....	10,381	31st " "
137	359	Hotewar Tea Co., Ltd.	16th July "	56,000	56,000	7,077	....	31st " 1878
138	360	Halligannata Co., Ltd.	22nd Sept. "	5,00,000	5,00,000	....	41,043	31st " 1879
139	361	Kamarhatti Co., Ltd.	28th " "	8,00,000	4,00,000	....	29,363	31st " "
140	362	Bogra Trading Co., Ltd.	27th Dec. "	20,000	1,848	177	....	12th Dec. " "
141	363	Seemah Tea Co., Ltd.	2nd Jan. 1878	1,00,000	63,100	....	....	31st " 1878
142	364	Singtom Tea Co., Ltd.	10th " "	1,60,000	1,60,000	....	1,485	31st " 1879
143	365	Bahadopore Tea Co., Ltd.	19th Mar. "	20,000	16,597	....	....	31st " "
144	367	Bengal Ice Manufacturing	9th July "	2,20,000	1,89,995	10,624	....	31st " "
145	368	Hindoo Tea Co., Ltd.	12th " "	35,000	4,826	....	....	31st " "
146	369	New Bridgeman Tea Co., Ltd.	19th " "	1,00,000	1,00,000	....	44,887	31st " 1878
147	370	Shahabad Suzzar Co., Ltd.	12th Sept. "	1,60,000	97,750	....	18,510	31st " 1879
148	372	Pathuriashazha Coal Co., Ltd.	16th " "	10,000	3,460	1,169	....	31st " "
149	373	Loobah Tea Co., Ltd.	27th " "	5,00,000	5,00,000	10,044	....	31st " "
150	374	Railway Hindoo Co-operative Society, Ltd.	13th Nov. "	20,000	4,593	443	....	31st " 1878
151	375	Nowres Nuddy Tea Co., Ltd.	25th Dec. "	5,00,000	42,250	....	....	31st " 1879
152	377	Longview Tea Co., Ltd.	16th Jan. 1879	3,44,000	3,44,000	....	2,626	31st " "
153	378	Darjeeling Tea and Chuchona Assn., Ltd.	16th " "	2,60,000	2,60,000	1,11,699	....	31st " "
154	379	The United Medical Assn., Ltd.	7th Feb. "	5,000	....	....	....	....
155	381	Bengali Stone Co., Ltd.	15th " "	80,000	....	....	....	....
156	382	Chitpore Hydraulic Pressing Co., Ltd.	17th Mar. "	4,00,000	4,00,000	61,065	....	31st Dec. 1879
157	383	Narai Trading Co., Ltd.	20th " "	20,000	5,050	466	....	31st " "
158	384	Keiteela Tea Co., Ltd.	25th " "	1,00,000	72,696	....	31st " "	31st " "
159	385	Munjing Tea Co., Ltd.	16th April "	1,50,000	1,50,000	137	....	31st " "
160	386	Darjeeling Steam Tramway Co., Ltd.	10th " "	14,00,000	....	....	....	....
161	388	Bytiazool Tea Co., Ltd.	23rd May "	55,000	....	....	....	....
162	389	Jamaipeore Ice Manufacturing Co., Ltd.	28th " "	10,000	7,120	489	....	31st Dec. 1879
163	390	Juijigoree Tea Co., Ltd.	29th " "	50,000	14,700	....	....	31st " "
164	391	Kackuarrah Lime Factory Co., Ltd.	6th June "	10,000	4,100	240	....	31st " "
165	392	Washabarree Tea Co., Ltd.	8th Aug. "	1,50,000	1,50,000	....	....	31st " "
166	393	Indian Portland Cement Co., Ltd.	18th " "	2,50,000	....	....	....	....
167	394	Tondoo Tea Co., Ltd.	19th Sept. "	64,000	....	....	....	....
168	395	Bengal Banking Corporation, Ltd.	4th " 1880	20,00,000	....	....	....	....
169	396	Teliachapore Tea Co., Ltd.	5th " "	50,000	....	....	....	....
170	397	Kurnafuli Association, Ltd.	5th " "	2,30,000	....	....	....	....
171	398	Naharioli Tea Association, Ltd.	14th " "	1,60,000	....	....	....	....
172	399	Hindu Union Bank, Ltd.	26th " "	10,000	....	....	....	....
173	400	Hajiganj Tea Association, Ltd.	5th Mar. "	70,000	....	....	....	....
174	401	Dacca Loan Office, Ltd.	29th " "	20,000	....	....	....	....
		Total	....	8,90,31,500	6,91,82,595	....	....	....

EXPOSURE OF EUROPEAN SAILORS TO THE SUN IN THE HOT WEATHER MONTHS.

THE following correspondence is published for general information.

No. 40T, dated Darjeeling, the 16th June 1880.

From—A. MACKENZIE, Esq., Secretary to the Government of Bengal, General Dept.,
To—The Asst. Secretary to the Government of Bengal in the Legislative Dept.

I AM directed to forward herewith a copy of the correspondence noted in the margin, regarding measures to prevent the unnecessary exposure to the sun of European seamen belonging to vessels lying in the port of Calcutta during the hot months of the year.

To Port Commissioners, No. 56, dated 27th April 1880.

From Port Commissioners, No. 606, dated 19th May 1880, and enclosures.

To Port Commissioners, No. 700, dated 25th May 1880.

From Port Commissioners, No. 734, dated 31st May 1880, and enclosure.

Memorial, without date, signed by the Lord Bishop, the Chief Justice, and other inhabitants, Calcutta.

European seamen may be employed on boardship on work necessitating exposure to the sun, and I am to request that you will, in communication with the Port Commissioners, draft for approval a short Act to be read with Act V (B.C.) of 1870, giving them this power.

3. At the same time the Lieutenant-Governor finds reason to believe that the direct mortality among seamen from the effects of exposure to the sun is not so great as the memorialists have been led to believe. The correspondence attached to the Port Commissioners' letter No. 606 of the 19th May, shows that in reality only one death of a European seaman occurred in 1879 from exposure to the sun on boardship. It is probable that the evil results of such exposure are manifested rather in fevers and other illnesses than in actual death from sunstroke. It is, however, desirable to bring the matter of the employment of sailors in the port under regulation.

No. 56, dated Calcutta, the 27th April 1880.

From—H. J. REYNOLDS, Esq., Secretary to the Govt. of Bengal, General Dept.,
To—The Vice-Chairman of the Port Commissioners.

THE attention of the Lieutenant-Governor has been directed to the question of European sailors belonging to vessels lying in the port being required to work in the open air during the heat of the day at this season of the year.

2. The Committee of the Sailors' Home circulated last year a small pamphlet of rules and suggestions for the treatment of sunstroke, and recommended that all work which required exposure to the sun should be performed either before breakfast or after 4 P.M. There is reason, however, to fear that this recommendation has not been generally attended to.

3. It seems doubtful whether the wording of the law would admit of a port rule on the subject being passed under Act XII of 1875, or Act V (B.C.) of 1870; but it appears to the Lieutenant-Governor that some interference on the part of the authorities is called for, and Sir Ashley Eden would be much obliged if the Port Commissioners would take the question into their consideration, and would favour him with an expression of their opinion as to the procedure which would be most applicable to the case.

No. 606, dated Calcutta, the 19th May 1880.

From—W. D. BRUCE, Esq., c.m., Vice-Chairman of the Port Commissioners,
To—The Secretary to the Government of Bengal, General Department.

I HAVE the honor to acknowledge receipt of your letter No. 56, dated 27th April 1880, requesting the Commissioners to take into consideration and report what steps can be taken to prevent sailors from being unnecessarily exposed to the sun during the heat of the day. On receipt of your letter, a copy of it was forwarded to the Commissioners' Solicitor, with a request that he would inform the Commissioners whether, under the provisions of any law now existing, they or Government could interfere in the matter. He replied that under no Act now in force could the Government or the Commissioners pass rules to restrain masters of vessels from employing their men on work, which necessitated exposure to the sun during the heat of the day. All that the Commissioners can do, he says, is to issue a request to masters of vessels, asking them to refrain during certain months from employing their men on such work.

2. The correspondence was submitted for the consideration of the Commissioners at last meeting, and it was then resolved that a notice should be put up in some conspicuous place

in the Port Office, requesting masters of vessels to refrain, as much as possible during the hot season, from employing their men between 11 A.M. and 4 P.M. on work involving exposure to the sun. The Commissioners agree with Mr. Sanderson in thinking that beyond this they have no power to interfere.

3. From a return prepared by the Commissioner of Police of the deaths among the sailors in port, attributable to sunstroke during 1879, a copy of which is submitted herewith, it will be seen that out of four fatal cases two were attributable to drink, and one was a Malay fireman, not a seaman, so that apparently there was only one case during 1879 which could be attributed to exposure to the sun.

No. 4976, dated Calcutta, the 30th April 1880.

From—CHARLES SANDERSON, Esq., Solicitor to the Port Commissioners,
To—The Secretary to the Port Commissioners.

I AM in receipt of your letter No. 410, dated the 29th instant, forwarding copy of a letter from the Secretary to the Government of Bengal, dated the 27th instant, and requesting me to inform the Commissioners whether they could interfere with a view to put a stop to European sailors belonging to vessels lying in the port of Calcutta working exposed to the sun at this season of the year.

I have considered the several Acts relating to the port of Calcutta and the shipping therein, and am of opinion that, under the Acts in force, no port rule can be framed which can have any force, and the way the Commissioners can interfere is to issue a request to all masters and officers of vessels, urging on them during the months, say of April, May, June, and July, or such other months as may be thought expedient, to refrain as much as possible from employing European seamen between the hours of 9 A.M. and 4 P.M. on work which will expose them to the sun and sunstroke. Of course if they do not take any notice of this request, and employ their men unnecessarily in the sun, whereby such men suffer, the Commissioners cannot prevent it.

No. 99, dated Calcutta, the 10th April 1880.

From—S. S. LYNCH, Esq., Health Officer of the Port of Calcutta,
To—The Commissioner of Police, Calcutta.

I HAVE the honor to invite your attention to a letter in the *Englishman* of the 8th instant, from the Rev. Mr. Bray, and to one in the 9th, from Dr. Joubert, calling attention to the unrecorded deaths, from the effects of heat, of seamen on board ships in the port; and with reference thereto, to solicit the favor of your informing me whether any such deaths have been included by the River Police in the return forwarded to me with your No. 689 of the 28th February. In that return you will find three sudden deaths of Europeans from apoplexy, &c, and it may be that these are the sort of cases alluded to by the correspondents of the paper referred to. My own limited experience in the port does not go to confirm the view taken by the Rev. Mr. Bray that many such deaths happen on board vessels in the river.

The total number of cases of sunstroke amongst English sailors afloat during last year, as shewn in the hospital returns, was two, with one death. The statement of the Reverend gentleman, however, makes it uncertain whether others did not happen besides those in the hospital.

It will be of great assistance to me in making out the health returns of the port in future, if you will be good enough to direct the supply to me of information regarding the deaths (Europeans and Natives) which occur in the river, at the same time as, and in the same form in which, it is given by the police to the Health Officer of the Town.

No. 1272, dated Calcutta, the 15th April 1880.

From—J. LAMBERT, Esq., Deputy Commissioner of Police, Calcutta,
To—The Health Officer of the Port of Calcutta.

WITH reference to your letter No. 99 of the 10th instant, I have the honor to inform

1. Richard Gilliot, Captain, 3rd January.
2. Henry Gill, A.B., 20th May.
3. William Webster, Second Officer, 23rd July.
4. Cincero, Fireman, 23rd July.

you that only four seamen, whose names are given on the margin, died from apoplexy on board of ships in the port of

Calcutta during the year 1879.

It was ascertained that the first was seen drunk for 24 hours previous to his death; that the third had been in a continued state of intoxication for three days, and that the fourth, Cincero the Malay, was a fireman and not a seaman, so that only one death from exposure to the sun occurred among seamen in the port during the past year. These deaths were all duly registered at the River Police stations, and were included in the return forwarded to you with this office letter No. 689 of the 28th February 1880.

No. 700, dated Calcutta, the 25th May 1880.

From—C. W. BOLTON, Esq., Under-Secy. to the Govt. of Bengal, General Dept.,
To—The Vice-Chairman to the Port Commissioners.

I AM directed to acknowledge the receipt of your letter No. 606, dated the 19th May 1880, with enclosures, and to request that you will be good enough to forward to this office a copy of the notice which the Commissioners propose to issue to masters of vessels at this port regarding the working hours of sailors during the hot season, in order that the Government may take measures to make it as widely known as possible.

No. 734, dated Calcutta, the 31st May 1880.

From—W. D. BRUCE, Esq., C.E., Vice-Chairman of the Port Commissioners,
To—The Secretary to the Government of Bengal, General Department.

In reply to your letter No. 700 of the 25th instant, I have the honor to submit herewith, for the information of Government, a copy of the notice to masters of vessels in the port regarding the working hours of the sailors during the hot season.

NOTICE.

THE Port Commissioners have recently had under consideration the subject of employing British sailors during the heat of the day on work which exposes them to the sun, or necessitates their confinement for a lengthened period in a badly ventilated ship's hold. Such exposure or confinement is calculated to induce fatal attacks of sunstroke and heat apoplexy, and during the hot season such cases frequently occur. The Port Commissioners therefore earnestly request that masters of vessels lying in the port during the months of April to October will refrain, as far as possible, from employing their men between the hours of 11 A.M. and 4 P.M. on work which necessitates exposure to the sun or confinement in the hold.

G. H. SIMMONS,
Secretary.

Port Commrs. Office, the 31st May 1880.

To the HON'BLE SIR ASHLEY EDEN, K.C.S.I., C.I.E., Lieutenant-Governor of Bengal.

The memorial of the undersigned inhabitants
of Calcutta and others.

RESPECTFULLY SHEWETH—

That there has existed for some time in the port of Calcutta a practice, as regards vessels lying in harbour, of putting the European sailors and ship apprentices on work outside the ships and also aloft during the hottest hours of the day in the months of the south-west monsoon, which extends from the 15th of March to the 31st of October.

That your memorialists are given to understand that the consequent exposure to the burning heat of a tropical sun is the direct cause of many of the numerous cases of sunstroke, heat apoplexy, and continued fever which usually occur in Calcutta during those months amongst European seamen; and the fact that some of these cases have terminated fatally supplies a strong argument for checking a practice which in itself is inhuman and is also unquestionably dangerous to health and life.

That your memorialists believe that, except in very rare instances, no real necessity exists for compelling European seamen to incur so formidable a peril whilst vessels are lying at anchor in a safe harbour.

That in the present state of the law a European sailor or apprentice cannot refuse to work in the manner and at the time above referred to without becoming liable to the penalty for disobedience of a lawful order, such penalty being imprisonment for four weeks and the forfeiture of two days' pay, or, if the disobedience is continued, imprisonment for twelve weeks and the forfeiture of six days' pay. That the power thus placed in the hands of a ship captain or mate is one which no master ought legally to be permitted to exercise over his fellow man except in a case of positive and well-proved necessity, and it is also a power which is obviously liable to abuse if the master should chance to be unfeeling and inconsiderate, or a man of an ill-regulated temper, or if he should desire either in his own interests or those of the shipowner so to act as to force his crew, or any particular sailor, to accept a discharge at the port of Calcutta.

That your memorialists are advised that the Port Commissioners of Calcutta, although armed with extensive powers for other purposes, have no authority to regulate the hours of work on board of ships whilst lying in port, or to prescribe what work only shall be done during certain hours, or what safeguards shall be used to diminish the risk of sunstroke and illness from exposure to the heat of the day, and that, in order to make rules for regulating these matters, it is necessary to have recourse to fresh legislation.

Your memorialists very respectfully submit, for your Honor's consideration, that such legislation falls peculiarly within the province of the Bengal Legislative Council, the port and city of Calcutta being subject to the administration of the Lieutenant-Governor of Bengal.

Your memorialists therefore pray—

That your Honor will be pleased to direct the introduction into Council of a Bill to confer upon the local Government, or such other authority as may seem advisable, power to make rules for regulating within the limits of the port of Calcutta, as regards European sailors and apprentices, the hours of labour and the distribution of work on board of ships during the south-west monsoon, with a view to prevent the unnecessary exposure of this class of the community to the risk of sunstroke and other diseases due to tropical heat, and also with a view to provide that, when such exposure is necessary, proper and sufficient precaution shall be used in order to diminish the risk.

EDWARD R. CALCUTTA.
RICHARD GARTH.
J. PITCHALL, M.D.
W. HENRY BRAY.
HENRY CAYLEY.
J. JONES, M.D.
WELBORE MACCARTHY.
GEORGE G. GILLAN.
CHAS. H. JOUBERT, M.B.
ARTHUR WILSON.
HENRY BEVERLEY.
C. O. WOODFORD.
JOHN CARRICK.
JOHN MORRISON.
JOHN F. MACNAIR.
JAMES HEPBURN.
WALTER EWING CRUM.
J. A. ANDERSON.
J. W. O'KEEFE.
W. J. M. McCAW.
JOHN FLEMINGTON.
C. S. DAWSON.
R. D. LYALL.
J. SEWELL WHITE.
T. B. HARRISON.
W. F. McDONELL.
CHARLES PONTIFEX.
HENRY BELL.
CHAS. T. MACLEAN.
J. F. BROWNE.
L. R. TOTTENHAM.
LOUIS JACKSON.
L. P. DELVES BROUGHTON.
SPENCER GORE BROWNE.
J. C. MACGREGOR.
A. PHILLIPS.
J. M. MARSDEN.
JOHN D. BELL.
A. B. MILLER.
JOHN ECKFORD.

WILLIAM CRAIK.
F. W. PEEL.
TAMVACO & CO.
GEORGE MILLER.
D. LANDALE.
JOHN M. LYALL.
G. H. SIMMONS.
C. J. WILKINSON, P. & O.
Supdt.
J. D. MACLEAN.
J. H. ROBINSON.
J. J. BROWNE.
T. H. MOSLEY.
D. J. WELSH.
HENRY P. P. PARKER.
C. SUMNER HABINGTON.
W. M. WA.
A. V. SANDEMAN.
H. J. C. TURNER.
F. A. GOODWIN.
K. B. STUART, M.D.
S. MIGNON.
T. & JAMES SAGE.
The Commander, British
Steamer *Sir William Peel*.
J. McARTHUR.
J. FERGUSON.
ARTHUR W. STIFFE, Port
Officer.
FRED. WARDEN.
R. B. YATES.
W. M. EDWARDS.
W. L. SEARLE.
GEO. TEALE.
J. H. O'BRIEN.
W. DUFF BRUCE.
JOHN V. FALLE.
J. SUTHERLAND.
H. T. PRINSEY.

Rainfall, Weather, and State and Prospects of the Crops.

Statement showing Rainfall, Weather, and State and Prospects of the Crops in the different Districts of Bengal, as reported to Government during the week ending the 19th June 1880.

No.	District, and date of return.	Rainfall at Sudder Station in inches.	Character of the weather, state and prospects of the crops, and state of health at date.
BENGAL			
<i>Western Districts.</i>			
BURDWAN DIVN.	1 Burdwan, June 19 '80	2.97	Weather—very sultry. Early rice and sugarcane getting on well. Late paddy being sown.
	Cutwa ..	1.22	
	Culna ..	3.94	
	Raneebungunge ..	2.25	
	2 Bankura, " 19 "	2.08	Weather—rainy and latterly hot. Rain slightly damaged sugarcane, cotton, and sesamum. Paddy had to be re-sown in Gungajalghati. Transplantation suspended. Rain everywhere except at Simlapal. Indigo doing well.
	Bishenpore ..	2.54	
	3 Beerbhoom, " 19 "	1.76	Latter half of week sultry. Cultivation and sowing going on. Outturn of sesamum very fair. Public health good.
	4 Midnapore, " 19 "	1.89	Weather—sultry. Some rain in first part of week. State and prospects of crops good, except where partial inundation has destroyed seed in Jalia bheel and Dubda jheel in Contai sub-division.
	5 Hooghly, " 19 "	4.07	Weather—cloudy; heavy showers on night of 16th; excessive heat for last three days. Early rice, sugarcane, and jute doing well. Transplanting of late rice progressing. General health good.
	Howrah " 21 "	3.12	
PRESIDENCY DIVN.	Moheshrekha ..	1.59	Weather—hot and steamy. State and prospects of crops good.
	<i>Central Districts.</i>		
	6 24-Pergunnahs, June 21 '80	3.83	Weather—seasonable. Sowings continue. Jute and rice crops promising. In Baripore only there is complaint on account of excessive rain. Public health good.
	7 Nuddea, " 19 "	1.26	Heavy rain early in week; latterly hot and cloudy. Crops promising everywhere, except in low lands in Meherpore sub-division, where they have been injured by heavy rain. Public health good.
	Kooshtea ..	3.07	
	Meherpore ..	1.52	
	Chooadanga ..	1.01	
	Ranaghata ..	2.43	
	Bongong ..	1.83	
	8 Jessor, " 19 "	9.20	Frequent heavy rain during week. Prospects of crops continue favourable. Health good.
RAJSHAHY AND COOCH BEHAR DIVN.	Jhenidah ..	3.50	
	Magoorah ..	3.08	
	Narail ..	3.84	
	Khoonla ..	3.22	
	Bagirhat ..	4.40	
	9 Moorschedabad, " 19 "	2.10	Weather—now very hot. Rain general. Prospects of crops good. Fever still in some thanas of Sudder; otherwise public health good.
	10 Dinagepore, June 18 '80	6.94	Heavy rain on 14th and 15th and general all over district. Some damage caused by flood to autumn rice and jute. Transplanting of winter rice begun.
	11 Rajshahye, " 19 "	5.03	Weather—hot and cloudy. Heavy rain in Nattore sub-division has done considerable injury to <i>boro</i> rice, sesamum, and jute. Standing crops in other thanas doing well. Public health good. Price of rice 16 to 20 seers per rupee.
	12 Rungpore, " 18 "	4.75	Weather—still cloudy; temperature cool. Continuous rain of last two weeks has damaged early rice. Public health good.
	Bagdogra ..	11.99	
DACC DIVN.	Kurigram ..	4.33	
	Gaibanda ..	4.51	
	13 Bogra, " 19 "	7.75	Weather—very oppressive until 18th, when a breeze sprang up in evening and has since continued. Except in respect of early rice on low lands, prospects of crops continue good.
	Pubna, " 19 "	4.23	Weather—cloudy, hot, and rainy. Crops do not appear to have suffered as yet to any extent from continued rain. Public health good. Two cases of small-pox.
	Darjeeling, " 19 "	5.77	More or less rain almost every day during week. In Terai <i>bhadoi</i> and <i>jumira</i> paddy progressing. Late paddy seedlings being transplanted. If constant heavy rain continues it will harm crops. In Hills Indian-corn and paddy promise well, if not injured by rain.
	Julpigoree, " 19 "	5.91	Incessant rain, but not so heavy as last week. Crops suffering from excessive rain, and agricultural operations very nearly at a stand-still. General health good, but small-pox still reported.
	Cooch Behar, " 17 "	7.86	Heavy rain nearly every day; lighter towards end of week. Complaints of damage to early rice beginning to be heard; but not any great damage done yet. A break, however, much to be desired. Public health good.
	Dinhatta ..	13.71	
	Mathabhanga ..	12.87	
	Meckligunge ..	13.39	
<i>Eastern Districts.</i>			
DACC DIVN.	17 Dacca, June 19 '80	5.03	Weather—seasonable. State and prospects of crops promising. Public health good.
	Manickgunge (for week ending 16th June.)	2.57	
	18 Furreedpore, " 20 "	0.95	Weather—showery. Crops excellent in spite of a little damage done in a few places by too much rain. If there is no sudden flood, crop will probably be a bumper one. Public health good.
	Madaripore ..	3.74	
	19 Baikergunge, " 17 "	4.26	Weather—cloudy and rainy. Some sun wanted for young rice, otherwise nothing to complain of. Prices inclined to fall.
	Mymensingh, " 18 "	9.33	Weather—seasonable. Heavy rain. State and prospects of crops good.
	Tipperah, " 18 "	9.43	Heavy rain over nearly whole of district. Cutting of chillie crop now completed; outturn good. Early and late rice and sugarcane in good condition.
	Brahmanbaria ..	5.40	
	Chandpore ..	7.57	

No.	District, and date of return.	Rainfall at Sudder Station in inches.	Character of the weather, state and prospects of the crops, and state of health at date.
BENGAL.—(Continued.)			
<i>Eastern Districts.—(Continued.)</i>			
CHITTAGONG DIVN.	22 Chittagong June 22 '80	13·45	Weather—rainy and cloudy. Heavy rain at Cox's Bazar. State and prospects of crops generally favourable. Cattle disease in some parts.
	23 Noakhally, " 17 "	14·43	Heavy rain. Weather cool. Early rice very forward. Plenty of water.
	24 Chittagong Hill Tracts .....	.....	Report not received.
	Hill Tipperah, " 16 "	8·27	Weather—rainy. Sowing of <i>satia</i> paddy finished. Public health good.
BEHAR.			
PATNA DIVN.	25 Patna, Barrh June 19 '80	6·31 0·16	Weather—seasonable. Heavy rain on 15th. Prospects of crops favourable.
	26 Gya, Nowada	2·55 2·8 1·98	Weather—hot and cloudy. Maximum reading in shade 106°. Sowing commenced. Public health generally good.
	27 Shahabad, " 19 "	3·91	Rain believed to have been general. More expected. Early rain is of much use for preparing soil for ploughing and sowing. Prices stationary. General health good.
	28 Durbhunga, " 19 "	0·90	Weather—hot and cloudy. Sowing of <i>bhadoi</i> crop and paddy in progress. Outturn of <i>moong</i> good. Prices stationary. Some fever at head-quarters.
	29 Mozufferpore, Hajeeopore	0·97 4·09 1·81	Weather—cool and cloudy. Rice and <i>bhadoi</i> crops being sown. Rice seedlings nearly ready for planting out.
	30 Saran, Sewan	6·91 2·72	Weather—hot and cloudy; east wind prevailing. Rain general throughout district. Preparations for sowing <i>bhadoi</i> crops begun. Prospects generally favourable.
	31 Chumparun, " 19 "	2·4	Weather—seasonable. State and prospects of crops very good.
	32 Monghyr, June 19 '80	0·78	Slight rain at Monghyr; heavier rain in interior, both north and south. Ploughing going on briskly. In some parts <i>bhadoi</i> paddy sown and germinated. River rising rapidly. Public health good.
	33 Begosserai, Jamui	4·58 4·74	Weather—cloudy and sultry. Sowing progressing favourably. Indigo prospects good.
	34 Purneah, Kissengunge	5·44 18·77	Constant rain and cloudy weather. In consequence of continual cloudy weather and heavy rain in north of district, prospects begin to look gloomy.
	35 Arrareah	8·41	Weather—very close and oppressive. Heavy rain in first part of week. Condition and prospect of paddy very good. Prices of food-grains stationary. Public health fair.
	36 Maldah, " 19 "	2·90	Excessive and unseasonable moist heat. State and prospects of crops good.
BHAUDEPORE DIVN.	36 Sonthal Pergha, Deoghar	4·71 5·40 1·22 5·30 6·08 2·05	
	37 Cuttack .....	.....	Report not received.
	38 Pooree, Khoordha	3·93 1·04	Weather—seasonable. Sowing of late rice still going on in some places. Elsewhere weeding of early rice commenced. <i>Arhar</i> and sesamum being sown. Price of common rice stationary. Public health good.
	39 Balasore, " 18 "	0·70	Little rain has fallen and heat much increased. Ploughing and sowing going on. Public health good.
	ORISSA.		
Orissa DIVN.	37	.....
	38	.....
	39	.....
CHOTA NAGPORE.			
<i>South-West Frontier Agency.</i>			
40	Hazareebagh, June 18 '80	3·46	Weather—rainy during early part of week, but during latter part hot and dry. Ploughing and sowing continue. General health good. Food-grains cheap.
41	Lohardugga, " 19 "	1·41	Weather—showery at commencement, and fine at close of week. A good deal of upland sown and crops look promising. Cholera cases still reported from Palamow, and small-pox all over district; otherwise public health good.
42	Singbhook, " 18 "	1·53	Weather—sultry and unsettled; latterly bright and hot. Break in rains favourable for agricultural operations. Public health good.
43	Manbhook, Govindpore	2·12 4·57	Weather—unsettled, with heavy rain till 16th. Since then getting very hot. Ploughing and sowing actively progressing. Sugarcane promises well. Public health good.

Published for general information.

CALCUTTA, STATISTICAL DEPT.,

The 22nd June 1880.

COLMAN MACAULAY,

Offg. Secy. to the Govt. of Bengal.

RETAIL PRICES-CURRENT OF FOOD-GRAINS, FIREWOOD, AND SALT IN THE
UNDERMENTIONED DISTRICTS OF BENGAL FOR THE
FORTNIGHT ENDING 15TH JUNE 1880.

RETAIL PRICES-CURRENT of Food-grains, Firewood, and Salt in the under-

Number.	DISTRICTS.	QUANTITIES PER RUPEE BY																							
		WHEAT.					BARLEY.					RICE, BEST SORT.					RICE, COMMON.					BULRUSH MILLET-CUMBOO, BAJRA.			
		Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.			
	BENGAL.																								
	Western Districts.																								
		S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.				
1	Burdwan	15	4	14	4	10	4	28	0	22	8	15	4	15	8	16	8	12	4	16	8	18	0		
		A																							
2	Bankura	14	12	14	8	11	12	17	0	17	0	14	0	18	8	18	12	12	4	20	8	20	8		
		B																							
3	Beerhoom	16	0	15	8	11	8	...	...	...	...	16	0	15	8	11	4	18	0	19	8	13	8
		C																							
4	Midnapore	11	0	11	0	10	0	...	...	...	...	15	0	15	0	12	0	18	0	18	0	13	8
		D																							
5	Hooghly	16	0	18	0	11	0	...	...	...	...	8	0	8	0	8	0	15	0	15	0	10	8
		E																							
	Howrah*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Central Districts.																								
		S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.	S. Ch.			
6	Calcutta	14	0	14	6	11	12	20	0	22	0	14	9	6	10	6	10	5	11	11	6	11	8	11	0
		F																							
7	24-Pergunnahs	8	0	...	6	8	14	0	13	5	10	0	
		G																							
8	Nuddea	16	13	17	4	12	5	26	10	26	10	16	0	12	13	13	5	10	0	15	4	14	8	10	10
		H																							
9	Jessore	14	0	14	0	11	0	14	8	14	8	9	2	20	0	20	0	11	8	...	
		I																							
10	Moorshedabad	20	0	18	11	13	8	14	0	13	5	10	8	17	0	18	0	12	0	...	
		J																							
11	Dinapore	13	8	11	0	10	3	14	8	14	0	13	5	12	0	15	0	16	0	18	0	12	0	...	
		K																							
12	Rajshahiye	20	0	{ 15 0 }	to { 20 0 }	13	8	26	4	30	0	18	8	15	0	16	8	{ 9 0 }	to { 9 12 }	16	8	18	0	{ 10 8 }	
		L																							
13	Rungpore	18	0	18	0	9	0	12	14	12	14	10	0	18	0	18	0	12	12	...	
		M																							
14	Bogra	18	12	19	8	12	0	15	8	18	0	7	15	24	0	24	12	9	12	...	
		N																							
15	Pubna	22	8	22	8	13	0	8	0	10	8	9	0	18	12	18	12	9	6	...	
		O																							
16	Darjeeling	8	0	8	0	8	0	10	0	10	0	8	0	4	8	5	0	4	0	12	0	12	0	...	
		P																							
17	Julpigoree	8	7	8	7	8	0	13	3	15	0	10	0	19	0	18	0	12	0	...	
		Q																							
18	Dacca	17	5	17	5	11	4	33	0	33	0	8	14	17	10	16	12	8	0	20	0	21	0	10	0
		R																							
19	Furreedpore	18	0	18	0	12	0	30	0	30	0	20	0	8	0	8	0	5	12	19	0	18	8	9	0
		S																							
20	Backergunge	16	0	16	0	8	8	16	0	16	0	8	4	20	0	20	0	9	0	...	
		T																							

* Return not received.

A In the interior the prices range as follow :—Wheat 16 to 18 seers, barley 25 to 30 seers, best rice 16 to 18 seers, common rice 17½ to 20 seers, and gram 20 seers.

B In the interior the prices range as follow :—Wheat 10 to 15 seers, barley 22 to 40 seers, best rice 14 to 22 seers, common rice 16 to 22 seers, maize or Indian-corn 20 to 30 seers, and gram 12 to 16 seers.

C In the interior the prices range as follow :—Wheat 11 to 20 seers, best rice 18 to 22½ seers, common rice 17 to 24 seers, and gram 11 to 25 seers.

D In the interior the prices range as follow :—Wheat 11 to 26 seers, barley 16 to 25 seers, best rice 8 to 18 seers, common rice 14 to 17½ seers, and gram 14 to 16 seers.

E In the interior the prices range as follow :—Wheat (in Kidderpore) 18½ seers, barley (in Kidderpore) 20 seers, best rice (in Kidderpore) 8 seers, common rice 18½ to 16 seers, maize or Indian-corn (in Kidderpore) 16 seers, and gram (in Kidderpore) 16 seers.

F In the interior the prices range as follow :—Wheat 16 to 22 seers, barley 24 to 36 seers, best rice 7 to 15½ seers, common rice 18½ to 20 seers, and gram 16 to 25 seers.

G In the interior the prices range as follow :—Wheat 8 seers, best rice 8 to 17 seers, common rice 17 to 20 seers, and gram 8 to 14½ seers.

H In the interior the prices range as follow :—Wheat 17 to 20 seers, barley 30 to 35 seers, best rice 14 to 16 seers, common rice 17 to 18 seers, and gram 21 to 23 seers.

RETAIL PRICES-CURRENT of Food-grains, Firewood, and Salt in the under

Number.	DISTRICTS.	QUANTITIES PER RUPEE BY																		
		WHEAT.			BARLEY.			RICE, BEST SORT.			RICE, COMMON.			BULRUSH MILLET— CUMBOO, BAJRA.						
Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.
<i>Eastern Districts.—(Contd.)</i>																				
		S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	
21	Chittagong	9 0	9 0	9 0	9 0	9 0	9 0	17 0	18 0	10 0	18 0	19 0	11 0	11 0	11 0	11 0	11 0	11 0	11 0	
		T																		
22	Noakhally	...	...	...	...	...	...	18 0	18 0	9 0	0	21 0	20 0	11 0	11 0	11 0	11 0	11 0	11 0	11 0
23	Tipperah	12 8	12 8	8 8	8 8	8 8	8 8	16 8	17 0	9 0	0	23 8	21 0	9 12	9 12	9 12	9 12	9 12	9 12	9 12
24	Chittagong Hill Tracts*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Hill Tipperah	9 0	9 0	8 0	8 0	8 0	8 0	15 0	16 0	9 5	5	23 0	24 0	11 0	11 0	11 0	11 0	11 0	11 0	11 0
<i>BEHAR.</i>																				
25	Patna	22 0	20 0	15 0	30 0	25 0	19 0	13 5	13 5	11 0	18 0	19 0	13 12	13 12	13 12	13 12	13 12	13 12	13 12	
		U																		
26	Gya	20 0	19 8	14 0	30 0	29 0	19 8	9 0	8 8	8 0	19 0	18 12	14 8	14 8	14 8	14 8	14 8	14 8	14 8	
		V																		
27	Shahabad	20 0	19 8	{ 13 4 } to { 14 0 }	30 0	30 0	19 0	16 0	16 0	{ 11 0 } to { 12 0 }	18 0	18 0	{ 13 0 } to { 13 8 }	25 0	25 0	25 0	25 0	25 0	25 0	25 0
		W																		
28	Durbhunga	20 0	20 0	12 0	32 8	36 8	18 0	12 0	12 0	10 4	15 0	16 0	13 0	13 0	13 0	13 0	13 0	13 0	13 0	
		X																		
29	Mezufferpore	21 0	21 0	14 0	30 0	30 0	20 0	11 0	10 0	8 0	16 0	16 0	12 0	12 0	12 0	12 0	12 0	12 0	12 0	
		Y																		
30	Sarun	16 4	16 0	12 12	30 8	29 0	19 0	8 8	8 8	6 8	16 8	16 0	14 4	14 4	14 4	14 4	14 4	14 4	14 4	
		Z																		
31	Chumparan	22 0	20 0	14 0	32 0	38 0	24 0	12 0	12 0	8 0	16 8	16 8	13 4	13 4	13 4	13 4	13 4	13 4	13 4	
		Z1																		
32	Moughyr	23 1	22 0	14 11	33 9	21 0	18 14	11 8	13 10	10 8	16 12	18 14	14 11	14 11	14 11	14 11	14 11	14 11	14 11	
		Z2																		
33	Bhagulpore	18 15	18 15	12 10	37 14	37 14	18 15	15 2	16 7	11 6	17 11	17 11	13 4	13 4	13 4	13 4	13 4	13 4	13 4	
		Z3																		
34	Purneah*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Z4																		
35	Maldah	18 0	20 0	12 0	...	...	...	12 0	11 0	10 0	19 0	17 8	11 0	11 0	11 0	11 0	11 0	11 0	11 0	
		Z5																		
36	Sonthal Pergunnahs	12 0	12 0	10 0	13 0	13 0	...	16 0	16 0	15 0	22 0	22 0	16 0	16 0	16 0	16 0	16 0	16 0	16 0	
<i>ORISSA.</i>																				
37	Cuttack	13 2	13 4	10 8	...	...	...	11 13	15 12	10 8	16 6	18 6	14 7	14 7	14 7	14 7	14 7	14 7	14 7	
		Z6																		
38	Pooree	9 0	7 0	11 13	...	...	...	12 0	14 0	9 12	19 0	18 0	15 12	15 12	15 12	15 12	15 12	15 12	15 12	
		Z7																		
39	Balasore	16 0	16 0	8 0	0	...	...	16 0	16 0	13 0	26 8	26 9	15 0	15 0	15 0	15 0	15 0	15 0	15 0	
<i>CHOTA NAGPORE.</i>																				
		Z8																		
40	Hazareebagh	17 0	17 8	11 0	27 0	30 0	15 0	10 0	12 0	8 0	24 0	23 0	14 8	14 8	14 8	14 8	14 8	14 8	14 8	
		Z9																		
41	Lohardugga	15 0	15 0	8 0	26 0	28 0	16 0	20 0	20 0	11 0	25 0	26 0	14 0	14 0	14 0	14 0	14 0	14 0	14 0	
		Z10																		
42	Singbham	16 0	12 0	8 0	32 0	32 0	20 0	28 0	28 0	10 0	32 0	32 0	15 0	15 0	15 0	15 0	15 0	15 0	15 0	
		Z11																		
43	Manbham	13 0	12 8	10 0	24 0	32 0	24 0	18 0	18 0	12 0	29 0	29 0	18 0	18 0	18 0	18 0	18 0	18 0	18 0	

* Returns not received.

† In the interior the price of common rice varies from 15½ to 21 seers per rupee.

§ In Hathazari the prices are—Best rice 20 seers, and common rice 21 seers.

T In the interior the prices range as follow :—Best rice 14 to 24 seers, and common rice 20 to 28 seers.

U In the interior the prices range as follow :—Wheat 10½ to 22 seers, barley 27½ to 30 seers, best rice (in Jehanabad) 10 seers, common rice 17½ to 22 seers, and gram 23 to 27½ seers.

V In the interior the prices range as follow :—Wheat 19½ to 21 seers, barley 30 to 32½ seers, best rice 10 to 12 seers, common rice 19 to 19½ seers, great millet (in Sasseram) 22 seers, lesser millets (in Madhoobani) 30 seers, maize or Indian-corn (in Madhoobani) 50 seers, and grain 21 to 24 seers.

W In the interior the prices range as follow :—Wheat 19 to 20 seers, barley 27½ to 40 seers, best rice 10 to 20 seers, common rice 18 to 22 seers, lesser millets (in Madhoobani) 30 seers, maize or Indian-corn (in Madhoobani) 50 seers, and grain 21 to 24 seers.

X In Hajesopore the prices are—Wheat 17 seers, barley 29 seers, best rice 9 seers, common rice 14 seers, maize or Indian-corn 20 seers, and grain 23 seers.

Y In the interior the prices range as follow :—Wheat 15 to 30 seers, barley 30 to 50 seers, best rice 13 to 19 seers, common rice 16½ to 23½ seers, maize or Indian-corn 20 to 45 seers, and grain 16 to 35 seers.

mentioned Districts of Bengal for the Fortnight ending 15th June 1880.—(Contd.)

THE SEER OF 80 TOLAHS.

GREAT MILLET— CHOLEUM, JOWAR.		LESSER MILLETS— RAGI OR MURWA AND CHEENA.		MAIZE OR INDIAN- CORN.		GRAM.		FIREWOOD.		SALT.		DISTRICTS.																						
Present return.	Next preceding return. of last year.	Present return.	Next preceding return. of last year.	Present return.	Next preceding return. of last year.	Present return.	Next preceding return. of last year.	Present return.	Next preceding return. of last year.	Present return.	Next preceding return. of last year.																							
<i>Eastern Districts.—(Contd.)</i>																																		
S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	Chittagong.																						
..	8	0	9	0	8	8	0	8	8	Chittagong.																	
..	8	0	8	0	7	0	..	..	..	Neakholly.																	
..	12	0	12	0	9	0	..	..	..	Tipperah.																	
..	9	0	9	0	8	0	..	..	..	Chittagong Hill Tracts.* Hill Tipperah.																	
BEHAR.													Patna.																					
..	30	0	30	0	26	8	26	0	25	0	16	0	140	0	140	0	8	0	8	0	Gya.								
25	0	27	0	20	0	29	0	..	25	0	24	0	20	0	25	0	23	8	15	0	140	0	140	0	160	0	9	0	9	0	Shahabad.			
..	27	8	22	0	22	0	27	8	22	0	24	0	22	0	21	0	14	0	160	0	160	0	140	0	8	0	8	0	Durbhunga.		
..	25	0	22	8	21	4	22	8	21	0	15	0	120	0	120	0	120	0	8	8	8	0	Mezuffapore.						
32	0	32	0	20	4	22	8	21	4	18	8	29	4	29	4	20	8	23	8	23	0	14	8	160	0	160	0	190	0	8	8	8	0	Sarun.
..	22	0	22	0	29	0	26	0	26	0	16	0	..	..	..	..	..	7	8	7	8	8	4	Chumparus.					
..	12	9	21	0	16	12	25	3	23	1	14	11	126	0	105	0	126	0	8	14	8	6	8	6	Monghyr.				
..	24	0	24	0	13	4	126	4	126	4	126	4	9	7	9	7	8	13	Bhagulpore.				
..	18	0	20	0	14	0	120	0	120	0	120	0	8	8	8	8	8	8	Purneah.*				
..	27	0	27	0	24	0	15	0	15	0	10	0	200	0	200	0	200	0	8	0	8	0	8	0	Maldah.				
..	27	0	27	0	24	0	15	0	15	0	10	0	200	0	200	0	200	0	8	0	8	0	8	0	Sonthal Perghs.				
ORISSA.													Cuttack.																					
..	13	2	15	12	14	7	..	..	..	17	1	17	1	14	7	160	0	160	0	200	0	10	0	11	0	11	0	Pooree.		
..	13	2	14	0	13	12	100	0	100	0	100	0	11	13	11	13	11	13	Balasore.				
CHOTA NAGPORE. <i>South-Western Frontier Agency.</i>													Hazareebagh.																					
..	36	0	40	0	24	0	32	0	32	0	18	0	19	8	20	0	12	8	200	0	200	0	240	0	7	8	8	0	7	0	Lohardugga.	
..	32	0	32	0	19	0	..	..	..	14	0	15	0	8	0	160	0	160	0	180	0	6	12	7	0	6	8	Singbhum.		
32	0	28	0	..	64	0	50	0	64	0	26	0	26	0	24	0	14	0	14	0	10	0	160	0	160	0	8	0	8	0	8	0	Manbhum.	

Z In Jamui the prices are—Wheat 22 seers, bari-y 80 seers, best rice 8½ seers, common rice 18 seers, great millet 23 seers, lesser millets 28 seers, maize or Indian-corn 26 seers, and gram 23 seers.

Z1 In the interior the prices range as follow:—Wheat 25 to 26 seers, barley (in Soopole) 24 seers, best rice 16 to 20 seers, common rice 20 to 22 seers, lesser millets 30 to 35 seers, and gram 16 to 17 seers.

Z2 In the interior the prices range as follow:—Wheat 16 to 18½ seers, barley (in Godda) 30 seers, best rice 21 to 22 seers, common rice 24 to 25 seers, maize or Indian-corn 18½ to 20 seers, and gram 15 to 17½ seers.

Z3 In the interior the prices range as follow:—Wheat 17 to 18 seers, barley (in Chutra) 30 seers, best rice (in Chutra) 15 seers, common rice 23 to 24 seers, lesser millets 32 to 40 seers, maize or Indian-corn 29 to 30 seers, and gram 18 to 24 seers.

Z4 In Lohardugga the prices are—Wheat 20 seers, best rice 26 seers, common rice 34 seers, and gram 23 seers.

Z5 In the interior the prices range as follow:—Wheat 8 to 13 seers, barley (in Govindpore) 24 seers, best rice 20 to 22 seers, common rice 23 to 24 seers, bulrush millet (in Govindpore) 32 seers, lesser millets (in Govindpore) 45 seers, maize or Indian-corn 30 to 40 seers, and gram 8 to 16 seers.

WHOLESALE PRICES-CURRENT of Food-grains, Firewood, and Salt in

Number.	MARTS.	PRICES PER MAUND																
		WHEAT.				BARLEY.				RICE, BEST SORT.				RICE, COMMON.				BULMUSH MILLET-CUMBOO, BAJRA.
		Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	Next preceding return.	Corresponding return of last year.	Present return.	
1	Calcutta ...	R. A. P. 2 14 6	R. A. P. 2 13 0	R. A. P. 3 6 9	R. A. P. 2 0 0	R. A. P. 1 12 0	R. A. P. 2 12 0	R. A. P. 6 0 0	R. A. P. 6 0 0	R. A. P. 7 0 0	R. A. P. 3 8 0	R. A. P. 3 5 0	R. A. P. 3 10 0	R. A. P. ...	R. A. P. ...	R. A. P. ...		
2	Serajunge ...	R. A. P. 2 4 0	R. A. P. 2 4 0	R. A. P. 3 8 0	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. 3 8 0	R. A. P. 3 8 0	R. A. P. 5 0 0	R. A. P. 1 8 0	R. A. P. 2 3 0	R. A. P. 4 8 0	R. A. P. ...	R. A. P. ...	R. A. P. ...		
3	Dacca ...	R. A. P. 2 4 0	R. A. P. 2 4 0	R. A. P. 3 7 0	R. A. P. 1 2 0	R. A. P. 0 1 2 0	R. A. P. 4 8 0	R. A. P. 2 2 0	R. A. P. 2 5 0	R. A. P. 4 12 0	R. A. P. 1 10 0	R. A. P. 1 13 0	R. A. P. 3 14 0	R. A. P. 2 8 0	R. A. P. 2 8 0	R. A. P. 3 8 0		
4	Narsaingunge ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. 1 13 0	R. A. P. 2 2 0	R. A. P. 4 12 0	R. A. P. 1 10 0	R. A. P. 1 14 0	R. A. P. 4 4 0	R. A. P. ...	R. A. P. ...	R. A. P. ...		
5	Chittagong ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. 2 4 0	R. A. P. 2 3 0	R. A. P. 3 14 0	R. A. P. 2 3 0	R. A. P. 2 0 0	R. A. P. 3 0 0	R. A. P. ...	R. A. P. ...	R. A. P. ...		
6	Patna ...	R. A. P. 1 13 0	R. A. P. 2 0 0	R. A. P. 2 10 9	R. A. P. 1 5 3	R. A. P. 3 1 9 6	R. A. P. 2 1 9 3	R. A. P. 0 0 3 0 0	R. A. P. 0 0 3 10 8	R. A. P. 2 3 6 2 1 9	R. A. P. 2 14 6	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...		
7	Balasore ...	R. A. P. 2 8 0	R. A. P. 2 8 0	R. A. P. 4 14 0	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. 2 8 0	R. A. P. 2 8 0	R. A. P. 3 0 0	R. A. P. 1 9 0	R. A. P. 1 10 0	R. A. P. 2 10 0	R. A. P. ...	R. A. P. ...	R. A. P. ...		
8	Pooree ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. 2 2 0	R. A. P. 2 2 0	R. A. P. 2 6 0	R. A. P. ...	R. A. P. ...	R. A. P. ...		
9	Cuttack ...	R. A. P. 3 0 0	R. A. P. 2 12 0	R. A. P. 3 10 0	R. A. P. ...	R. A. P. ...	R. A. P. ...	R. A. P. 3 4 0	R. A. P. 2 7 0	R. A. P. 3 10 0	R. A. P. 2 1 0	R. A. P. 2 0 0	R. A. P. 2 10 0	R. A. P. ...	R. A. P. ...	R. A. P. ...		

CALCUTTA,
The 22nd June 1880.

the undermentioned *Marts of Bengal* for the Fortnight ending 15th June 1880.

OF 40 SEERS.

GREAT MILLET— CHOLUM, JOWAR.		LESSER MILLET— RAGI OR MUWVA AND CHEENA.		MAIZE OR INDIAN- CORN.		GRAM.		FIREWOOD.		SALT.		MARTS.		
Present return.	Net preceding return. Corresponding return of last year.	Present return.	Net preceding return. Corresponding return of last year.	Present return.	Net preceding return. Corresponding return of last year.	Present return.	Net preceding return. Corresponding return of last year.	Present return.	Net preceding return. Corresponding return of last year.	Present return.	Net preceding return. Corresponding return of last year.	Present return.	Net preceding return. Corresponding return of last year.	
R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	R. A. P.	
1 12	6 2 0	0 3 12 0	...	...	...	2 0 0 2	8 0 3	0 0 2	5 0	2 5 0 3	4 6 0	3 0 6 3 0	8 0	4 0 0 4 0 0 4 6 0
...	2 12 0	2 4 0 4 0 0	...	...	...	4 6 0 4 6 0 4 6 0
...	2 7 0	2 9 0 3 14 0	0 6 0 0	6 0 0 6 0	4 2 0 4 2 0 4 6 0	Dacca.
...	2 10 0	3 0 0 4 0 0 0	8 0 0 8 0 0	5 3 4 1 0 4 2 0 4	3 3	Naraiungunge.
...	Chittagong.
...	1 6 3 1	5 3 1	8 0 1	8 6	1 9 6 2	8 0 0 4 9 0	4 9 0 4 9	5 0 0 5 0 0 5 0	Patna.
...	5 0 0	5 0 0 4 14 0	0 5 3 0	5 0 0 5 4	4 6 0 4 6 0 4 14 0	Balasore.
...	Pooree.
...	...	3 0	0 2 6	0 2 10 0	...	...	...	2 4 0	2 4 0 2 10 0	0 4 0 0	4 0 0 3 0	3 12 0 3	6 0 3 8 0	Cuttack.

Published for general information.

COLMAN MACAULAY,
Offy. Secy. to the Govt. of Bengal.

Results of the Meteorological Observations taken at the Alipore Observatory from
13th to 19th June 1880.

Month.	Date.	Maximum in sun.	Mean pressure barometer at 72° Fahr.	TEMPERATURE.				HYGROMETRY.				WIND.		Miles recorded.	Rain,	WEATHER.
				Mean	Maximum.	Range.	Minimum.	Mean wet bulb.	Vapour tension.	Dew point.	Humidity.	Prevailing direction.				
1880.																
June	13th	147·1	29·499	83·6	87·4	7·8	79·8	80·6	1·007	79·4	88	Till 8·45 A.M. S E, till 4·30 P.M. S S E, till 9 P.M. S, till midnight S S E.		84	Nil	Cloudy, o t d.
"	14th	116·2	29·463	82·0	84·8	4·9	79·9	80·2	1·009	79·5	92	Till 9·45 A.M. S S E, till midnight chiefly S W by S.		87	0·17	Cloudy, o g t d.
"	15th	136·7	29·462	82·6	86·3	7·7	78·6	78·6	0·924	76·8	83	Till 9 A.M. S W, till 8 P.M. W, till midnight W S W.		183	0·18*	Cloudy, o g d p.
"	16th	86·1	29·480	80·6	83·2	7·9	75·3	78·1	0·930	77·0	89	Till 8·30 A.M. W S W, till midnight S W by S.		197	2·33	Cloudy, o g p.
"	17th	147·4	29·486	86·6	93·0	12·4	80·6	82·6	1·070	81·3	84	Till noon chiefly S W, till midnight chiefly S S W.		226	0·03†	Cloudy.
"	18th	151·8	29·529	87·7	94·7	11·7	83·0	83·9	1·112	82·5	85	Till noon chiefly S S W, till midnight chiefly S.		161	Nil	Cloudy, o.
"	19th	165·1	29·559	86·5	96·2	13·1	83·1	82·6	1·067	81·2	85	Till noon S, till 2·45 P.M. N N W, through S W W and N W, till midnight chiefly E S E through W, S & S E.		158	0·04	Cloudy o g t d.

* 0·11 fell since 5 P.M. of the 14th.

† Fell since 6·45 P.M. of the 16th.

The mean pressure of the seven days	... ...	Inches.	29·497
The average pressure of the corresponding period for 24 years, S. G. Office	... ...		29·532
The mean temperature of the seven days	... ...		84·2
The average temperature of the corresponding period for 24 years, S. G. Office	... ...		84·2
The extreme variation of temperature during the seven days	... ...		20·9
The maximum temperature during the seven days	... ...		96·2
The highest velocity of the wind in one hour during the seven days	... ...	Miles.	15
The highest pressure of the wind on one square foot during the seven days	... ...	Ibs.	1
The mean relative humidity during the seven days	... ...	%	87
The average relative humidity of the corresponding period for 24 years, S. G. Office	... ...		83
The total fall of rain from 13th to 19th June 1880	... ...	Inches.	2·75
The average fall of the corresponding period for 24 years, S. G. Office	... ...		3·93
The total fall from 1st January to 19th June 1880	... ...		17·88
The average fall of the corresponding period for 24 years, S. G. Office	... ...		17·23

The mean pressure, temperature, &c., are deduced from the traces of the barograph and thermograph. The maximum and minimum temperatures are obtained from self-registering thermometers. All the thermometers are verified, and the readings have been corrected to a standard constructed and verified at the Kew Observatory. They are exposed under a thatched shed open at the sides, and are suspended four feet above the ground.

The barometer readings are corrected approximately to those of the standard Newman's No. 86, formerly at the Surveyor-General's Office.

The hygrometric elements are obtained from Tables III, IV, and V of the official tables computed in the Meteorological Office, and based on Regnault's modifications of August's formula.

The direction and movement of the wind are taken from the trace of a Beckley's anemograph.

The mouth of the rain-gauge is one foot above the ground.

o overcast, g gloomy, t thunder, d drizzling rain, p passing temporary showers, l lightning.

METEOROLOGICAL OFFICE, INDIA,
The 21st June 1880.

JOHN ELIOT,
For Meteorological Reporter to the Government of India.

Table of Rainfall recorded at Stations in Bengal in May 1880.

Table of Rainfall recorded at Stations in Bengal in May 1880—continued.

Jalpaiguri District.		Dacca.		Chittagong.	
Cooch Behar	District.	1.16	0.82	0.11	0.00
Buda	0.65	0.52	0.77	0.94	0.00
Titara*	0.84	0.11	0.17	0.00	0.00
Gauhati	0.63	0.07	1.22	0.00	0.00
Durgah Jhar*	0.70	0.07	1.35	0.00	0.00
Bansdroni	0.05	0.00	0.00	0.00	0.00
Pionoor	0.00	0.00	0.00	0.00	0.00
Coch Behar, Trinopoly States.	0.00	0.00	0.00	0.00	0.00
Coch Behar	0.48	0.40	0.11	0.00	0.00
Dinajpur	0.00	0.00	0.00	0.00	0.00
Mishnabang	0.00	0.00	0.00	0.00	0.00
Mecklingang	0.00	0.00	0.00	0.00	0.00
Dacca District.	0.00	0.00	0.00	0.00	0.00
Dacca	0.00	0.00	0.00	0.00	0.00
Moonthongunge	0.00	0.00	0.00	0.00	0.00
Manikgunge	0.00	0.00	0.00	0.00	0.00
Faridspore District.	0.00	0.00	0.00	0.00	0.00
Faridspore	0.00	0.00	0.00	0.00	0.00
Goalundo	0.00	0.00	0.00	0.00	0.00
Madarpore	0.00	0.00	0.00	0.00	0.00
Bakergunge District.	0.00	0.00	0.00	0.00	0.00
Burnia*	0.01	0.00	0.00	0.00	0.00
Patna*	0.00	0.00	0.00	0.00	0.00
Patsonkhalia*	0.00	0.00	0.00	0.00	0.00
Rials*	0.00	0.00	0.00	0.00	0.00
Mymensingh District.	0.40	0.39	0.03	0.00	0.00
Jamalpore	0.00	0.00	0.00	0.00	0.00
Alia	0.00	0.00	0.00	0.00	0.00
Kohorong*	0.00	0.00	0.00	0.00	0.00
Chittagong District.	0.00	0.00	0.00	0.00	0.00
Chittagong	0.00	0.00	0.00	0.00	0.00
Con's Basar	0.00	0.00	0.00	0.00	0.00
Nashkhelly	0.00	0.00	0.00	0.00	0.00
Fenny	0.27	0.27	0.00	0.00	0.00
Tipperah District.	0.00	0.00	0.00	0.00	0.00
Comilla	0.00	0.00	0.00	0.00	0.00
Chandpore	0.00	0.00	0.00	0.00	0.00
Brahmanbaria	0.00	0.00	0.00	0.00	0.00
Hill Tipperah District.	0.00	0.00	0.00	0.00	0.00
Agartala	0.00	0.00	0.00	0.00	0.00

CHITTAGONG.

Table of Rainfall recorded at Stations in Bengal in May 1880—concluded.

* Not received from 30th to 31st May 1880.
† Ditto from 16th to 22nd and 30th and 31st May 1880.

Supplement to the Rainfall Table for February 1880.

Supplement to the Rainfall Table for March 1880.

Supplement to the Rainfall Table for April 1880.

METEOROLOGICAL OFFICE, BENGAL,
The 21st June 1880.

John Elliott,
Meteorological Reporter to the Govt. of Bengal.

Weekly Return of Traffic Receipts on Indian Railways.

EAST INDIAN RAILWAY.

Approximate Return of Traffic for week ended 12th June 1880 on 1,507 $\frac{1}{4}$ miles open.

	COACHING TRAFFIC.			MERCHANTISE AND MINERAL TRAFFIC.			TOTAL TRAFFIC RECEIPTS.	TRAIN MILES RUN.		
	No. of passengers.	Coaching receipts.	Weight carried.	Receipts.	Coaching.	Merchandise.		Coaching.	Merchandise.	Total.
Total traffic for the week...	148,459	Rs. A. P. 1,71,298 0 0 113 10 4	E. s. d. 15,701 8 1 10 8 4	Mds. s. 12,60,011 10	Rs. A. P. 5,04,691 11 6 334 7 1	E. s. d. 46,208 8 2 30 13 2	Rs. A. P. 6,75,379 12 6 448 1 5	45,696 ¹	95,711	141,416 ¹
Or per mile of railway...								.....	.....	.....
For previous 22 weeks of half-year...	3,632,964	50,87,760 14 6	466,378 1 8	3,24,58,742 30	1,37,02,407 8 2	1,256,054 0 5	1,87,90,185 6 8	1,071,563	2,479,148 ¹	3,550,711 ¹
Total for 23 weeks...	3,781,423	52,58,048 15 0	482,079 9 9	3,37,18,754 0	1,42,06,499 3 8	1,302,262 8 7	1,94,65,545 2 8	1,117,262 ¹	2,574,850 ¹	3,692,125 ¹
COMPARISON.										
Total for corresponding week of previous year...	146,074	1,63,587 4 0	14,995 9 11	13,90,020 30	5,99,181 8 5	54,924 19 6	7,62,768 12 5	51,472	107,951	155,733
Per mile of railway, corresponding week of previous year...	.....	108 8 7	9 19 0	.....	337 8 6	36 8 9	506 1 1	.....	.....	.....
Total to corresponding date of previous year...	3,825,065 ¹	54,12,511 11 3	496,238 11 5	3,70,96,656 20	1,55,46,509 1 9	1,423,096 13 5	2,09,60,020 13 0	1,241,361	2,939,493	4,180,854

EASTERN BENGAL RAILWAY.

Approximate Return of Traffic for week ended 5th June 1880 on 171 $\frac{1}{4}$ miles open.

	COACHING TRAFFIC.			MERCHANTISE AND MINERAL TRAFFIC.			Total receipts.
	Number of passengers.	Coaching receipts.	Weight carried.	Receipts.	Coaching.	Merchandise.	
Total traffic for the week...	32,985	Rs. A. P. 20,850 0 0	E. s. d. 1,912 1 6	Mds. s. 1,80,550 0	Rs. A. P. 28,460 9 0	E. s. d. 2,608 16 8	4,520 15 2
Or per mile of railway...	192	121 7 2	11 2 8	1,051 10	165 11 4	15 3 9	23 6 5
For previous 22 weeks of half-year...	896,159 ¹	7,04,688 6 2	64,596 8 10	42,85,339 35	7,72,317 7 10	70,795 15 3	153,332 4 1
Total for 23 weeks...	920,154 ¹	7,25,547 6 2	66,508 10 4	44,65,949 35	8,00,777 7 10	73,404 11 11	1,30,913 2 3
COMPARISON.							
Total for corresponding week of previous year...	45,874	30,222 11 5	2,770 8 4	2,04,452 5	38,597 10 9	3,538 2 5	6,308 10 9
Per mile of railway, corresponding week of previous year...	267	175 15 8	16 2 7	1,190 16	23 11 7	20 12 0	36 14 7
Total to corresponding date of previous year...	950,409	7,46,100 15 0	68,392 11 8	38,65,374 11	7,11,391 5 2	65,210 17 6	133,693 9 2

EASTERN BENGAL RAILWAY.

Approximate Return of Traffic for week ended 12th June 1880 on 171 $\frac{1}{4}$ miles open.

	COACHING TRAFFIC.			MERCHANTISE AND MINERAL TRAFFIC.			Total receipts.
	Number of passengers.	Coaching receipts.	Weight carried.	Receipts.	Coaching.	Merchandise.	
Total traffic for the week...	34,450	Rs. A. P. 22,489 0 0	E. s. d. 2,061 9 10	Mds. s. 1,60,500 0	Rs. A. P. 28,057 0 0	E. s. d. 2,578 12 10	4,636 2 8
Or per mile of railway...	201	150 15 0	12 0 1	934 20	163 11 4	14 19 10	26 10 11
For previous 22 weeks of half-year...	920,154 ¹	7,25,547 6 2	66,508 10 4	44,65,949 35	8,00,777 7 10	73,404 11 11	130,913 2 3
Total for 24 weeks...	963,004 ¹	7,48,036 6 2	68,570 0 2	46,38,449 35	8,28,804 7 10	75,979 4 9	144,549 4 11
COMPARISON.							
Total for corresponding week of previous year...	35,688	24,518 0 7	2,247 9 9	1,92,086 11	36,753 10 2	3,369 1 8	5,616 11 5
Per mile of railway cor. week of previous year...	208	142 12 1	13 1 8	1,118 16	213 15 11	19 19 4	33 14 0
Total to corresponding date of previous year...	986,097	7,70,618 15 7	70,640 1 5	40,60,460 22	7,48,144 15 4	68,579 19 2	139,229 0 7

BENGAL PROVINCIAL RAILWAYS.

Weekly Statement of Traffic Receipts.

No. 18.

	Name of Railway.	Length open.	RECEIPTS FOR WEEK ENDING		TOTAL RECEIPTS FROM 1ST JANUARY		Total increase in 1880.	Total decrease in 1880.
			10th May 1879.	8th May 1880.	To 16th May 1879.	To 8th May 1880.		
1880.		Miles.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
16th May ...	Northern Bengal ...	230	43,756 0 0	26,862 0 0	4,06,016 0 0	5,27,370 0 0	1,21,354 0 0	.....
8th do. ...	Tirhoot ...	82	9,918 0 0	10,946 0 0	1,82,390 0 0	1,99,871 0 0	17,481 0 0	.....
22nd do. ...	Calcutta and South-Eastern...	28	2,745 0 0	2,106 0 0	51,407 0 0	48,056 0 0	.....	3,371 0 0
8th do. ...	Nalhati ...	27 $\frac{1}{2}$	1,752 0 0	1,382 0 0	33,450 0 0	39,094 0 0	.....	4,356 0 7
8th do. ...	Patna and Gya ...	57	2,818 0 0	0,411 0 0	7,207 0 0	1,72,770 0 0	1,65,563 0 0	.....
	Total ...	424 $\frac{1}{2}$	60,989 0 0	50,707 0 0	6,80,470 0 0	9,77,141 0 0	3,04,398 0 0	7,727 0 0



SUPPLEMENT TO The Calcutta Gazette.

WEDNESDAY, JUNE 30, 1880.

OFFICIAL PAPERS.

Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on payment of Six Rupees per annum if delivered in Calcutta, or Twelve Rupees if sent by Post.

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RESOLUTION ON THE IMPROVEMENT OF THE DRAINAGE OF TOWNS AND VILLAGES IN BENGAL.

MEDICAL AND MUNICIPAL DEPARTMENT.—SANITATION.

Darjeeling, the 12th June 1880.

RESOLUTION.

READ again—

A letter dated 9th April 1878, from Rajah Degumber Mitter, c.s.i., explaining his views as to the causes of the epidemic fever which from time to time appears in different parts of Bengal, and containing suggestions for its prevention.

Read—

- (1) Government letter No. 1424, dated 17th April 1878, to the Sanitary Commissioner, Bengal, asking him to report how far the views of Rajah Degumber Mitter were borne out by the results of his inspection of the districts of Rungpore and Dinagapore;
- (2) Government circular resolution, dated 29th April 1878, making further remarks on the general subject of the improvement of the drainage of towns and villages in Bengal, and calling for a report as to the action taken by district officers and local bodies under Government order of August 1877, relating to the same subject;
- (3) Letter No. 7268, dated 23rd September 1879, from Dr. Coates, Sanitary Commissioner, Bengal, in reply to Government order, dated 17th April 1878, referred to above, submitting, with his own views, an abstract of reports made to him by district officers;
- (4) Replies from all Commissioners (except the Commissioner of the Presidency Division), in response to Government circular resolution dated 29th April 1878.
- (5) Letter No. 4MM, dated the 7th April 1880, from the Commissioner of the Presidency Division, submitting copy of a letter from the District Road Committee of the 24-Pergunnahs, together with a report drawn up by Mr. Whitfield, c.e., Executive Engineer, Northern Drainage and Embankment Division, with a Resolution of the Road Cess Committee, dated 13th March 1880, regarding the improvement of the drainage of the villages in the rural portion of the district outside municipal limits;

(6) Letter dated 11th October 1879, from the Secretary, British Indian Association, communicating the views of the Committee on the subject of obstructed drainage;

(7) Government letter No. 119, dated 1st November 1879, and circular No. 7, dated 1st idem, to all Commissioners, asking for a report on the proposals of the British Indian Association;

(8) Replies from Commissioners to the above call.

THE Lieutenant-Governor has read with interest the full and able report submitted by Dr. Coates, and the analysis of the district reports submitted by him. Dr. Coates is not disposed to adopt the theory of fever-causation held by the late Rajah Dogumber Mitter, and adduces reasons for doubting whether it holds good in Bengal, at any rate in the precise form in which the Rajah usually presented it. He denies that water-logging of the soil can by itself explain the phenomena of the endemic fevers of the country. He inclines to the belief that the true explanation is to be found in the germ-theory of the propagation of diseases of this class, their *nidus* being found in the faecal and other impurities saturating village sites, and the sole remedy being, in Dr. Coates' opinion, the extension of cultivation and the application of this refuse matter to its proper uses in the manuring of the soil. The Lieutenant-Governor will not attempt to discuss the germ-theory of disease with Dr. Coates, or to estimate the precise value of his arguments. He must, however, observe that there are some facts in connection with the subject which the theory advanced by the Sanitary Commissioner does not seem to meet: thus, for instance, it does not explain the notorious fact that in damp and water-logged districts, like those of Eastern Bengal and Burmah, the people do not die of fever when they sleep on platforms well raised from the ground. Yet the village sites are there as fully charged with organic impurities as those of the most fever stricken districts of Central Bengal. Then, again, the best-cultivated districts of Bengal are those in which the fever has been worst. There is at the same time great force in Dr. Coates' remarks as to the good likely to result from a proper disposal of the refuse matter of towns and villages; but the people are unfortunately not yet alive to the advantages of this.

2. The Lieutenant-Governor is, however, glad to find from the reports received by Government that within the limits of municipalities and unions much has been done, since the issue of the Government orders of August 1877, to improve local drainage and to introduce that improved conservancy to which the Sanitary Commissioner very rightly attaches such great importance. Very much, however, still remains to be done, and the Sanitary Commissioner and local authorities must continue to devote unremitting attention to the provision of effective surface-drainage in towns and villages, to the introduction of a proper conservancy, and to the purification of the supplies of drinking-water. As already promised, if in any case municipal funds are inadequate for the carrying out of really useful schemes likely to do good on a large scale, the Lieutenant-Governor will be ready to consider reasonable applications for assistance. In Dinagepore and Rungpore, schemes of drainage have already been started with the help of Government, which are expected very materially to benefit those stations. But, generally speaking, as far as municipalities are concerned, they must be content to advance steadily, though perhaps slowly, in the path of improvement, as their existing means may enable them.

3. In villages not under municipal regulations of any kind it is impossible to expect much sanitary improvement until the people become more sensible of its advantages. Steps are now being taken to have the rudiments of sanitary knowledge taught in all the primary and other local schools of Bengal; and it may be hoped that, ere many years are past, a great change in feeling and opinion on this subject will come over the mass of the people. Meantime district officers should do what they can to encourage the making of tanks and wells for the supply of good drinking-water, while zemindars and other enlightened members of the native land-holding class will often be able, at small cost to themselves, to effect improvements in drainage on their estates to the obvious benefit of their poorer neighbours.

4. In respect of the general improvement of district drainage, the weight of opinion among those consulted is adverse to the suggestion that the District Road Committee should be placed in charge of all such works within

the district. Municipal works and works in charge of canal or embankment engineers of the Public Works Department could not certainly be placed under district road committees. In the Cess Bill, however, which has recently passed the Bengal Council, power has been given to these committees to spend part of their funds upon "the construction and maintenance of any means and appliances for improving the supply of drinking-water or for providing or improving drainage." This will enable them to initiate and carry out many useful works; and it should be a standing instruction to the district engineer and his staff to lose no opportunity of bringing before the committee and the magistrate of the district any obvious obstructions to drainage that may be discovered by them in the course of their ordinary duties. The existing law gives, as has been already pointed out, large powers to the district officer of remedying such evils. There is no reason, also, why the district engineering staff should not be utilized at times in superintending their removal, so long as this does not interfere with their proper work.

5. For carrying out more extensive schemes of drainage, which involve questions of reclamation, the amended Drainage Act, which has just received the assent of the Governor-General, will provide increased facilities. The Lieutenant-Governor hopes to see large advantage taken of the provisions of that Act, and will, as far as possible, be ready to lend the services of Government engineers for the purpose of examining and developing any likely projects of that class. Meantime the very interesting and suggestive report by Mr. Whitfield on the drainage of the 24-Pergunnahs will be referred to the Irrigation Branch of the Public Works Department of this Government for early consideration. The Government will be ready to give every encouragement to render possible the carrying out of the schemes suggested by Mr. Whitfield, or any part of them declared to be sound. Something has already been done in the way of providing drainage-sl uices in the 24-Pergunnahs, partly from provincial funds, and partly by contributions as for tuccavee works. But the whole subject will now receive careful reconsideration from the Chief Engineer in the Irrigation Department.

6. The reclamation of the Salt-water Lake, to which Mr. Whitfield refers, is a project which the growing prevalence of fever in Calcutta makes it very desirable to see again brought forward. The Lieutenant-Governor would be prepared to support the grant of any reasonable concessions to any substantial company undertaking this work. Mr. Whitfield is of opinion that all these reclamation projects would amply repay those who carry them out.

7. A comprehensive and costly scheme for improving the water-supply and drainage of the Hooghly district, which has so long suffered from a fatal fever attributable to bad water and the evil effects of blocked drainage and stagnant water-courses, is now being carried out from Provincial Funds; the people of the district having shown themselves unwilling to provide funds for works which are admittedly essential to the preservation of public health in that district. As funds are available, the Lieutenant-Governor hopes gradually to carry out similar schemes elsewhere. The Public Works Department will be requested to examine the reports now submitted from other districts, and to make further enquiries with reference to any projects which appear *prima facie* to be promising. But generally speaking, it must, as the Lieutenant-Governor observed in the circular of August 1877, rest with local officers and public bodies, or with those directly interested, to bring forward schemes for improvement and reclamation, availing themselves of the powers which have been, or are about to be, given them under the law, and of the aid which the Government is always anxious to afford them.

ORDER.—Ordered that a copy of this Resolution be forwarded to all Commissioners of Divisions for information and communication to district officers. Also that a copy be forwarded to the Sanitary Commissioner, Bengal, for information. Also that a copy of this Resolution, and of Mr. Whitfield's report, be forwarded to the Public Works Department (Irrigation Branch) of this Government, for early consideration.

By order of the Lieutenant-Governor of Bengal,

A. MACKENZIE,
Secretary to the Government of Bengal.

Dated the 9th April 1878.

From—RAJAH DIGUMBER MITTER, C.S.I.,

To—The HON'BLE ASHLEY EDEN, C.S.I., C.I.E., Lieutenant-Governor of Bengal.

As I feel convinced, after careful enquiry and observation, extending over the last fourteen years, that the cause of the disease, commonly called the epidemic fever, which rages endemically every year in this country after the close of the rains, and which has reduced some of the fairest portions of Bengal into a chronic state of unhealthiness, and rendered them unfit for human habitation, is an easily preventable one, I venture to approach your Honor with the following remarks and suggestions on the subject.

The sole cause to which I attribute the outbreak of the fever, which, as I have observed above, rages endemically every year in this country after the close of the rains with epidemic intensity, was thus described by me in a pamphlet on the subject (p. 16) which I issued sometime ago : “ The type of fever met with in the epidemic districts is solely due to *something* in the soil—and the condition most favorable to the development of *that something* is excessive or abnormal humidity of the subsoil; secondly, that when such a state of the subsoil is not the normal condition (in some places excessive humidity is natural, owing to the extreme porousness or some other peculiarity of the soil, as in the case of almost the whole district of Rungpore, where consequently this type of fever rages endemically) the cause which operates most powerfully to produce that condition is impeded drainage; and thirdly, that it is the inordinate humidity of the subsoil of towns and villages, and not of the paddy-fields and jullas, which contributes to the outbreak of the fever with epidemic intensity. Strange as it may appear, it is none the less true that the fact, that the natural drainage of a Bengal town cannot with impunity be interfered with, which of all others should have forced itself generally into notice, is yet just the one least generally known or recognized—and it is to this ignorance or indifference that is to be attributed the ruin of many flourishing cities and towns, both in earlier and later times.”

As a most significant fact, expressive of the normal sanitary condition of the country, consequent upon the periodical rains, and one calculated to throw considerable light on the subject-matters of enquiry, I quote the following from page 37 of the same pamphlet : “ It should not be forgotten also that every village in Lower Bengal is more or less humid after the cessation of the rains, from the beginning of October to the middle of December—more so than during the continuance of the rains, and fever, precisely of the epidemic type, though not in any aggravated form, is more or less rife throughout Bengal during those months than at any other time of the year. Hence the period is characteristically described in our country by the term of *Jamastaka*—meaning that during that period all the eight portals of the mansion of Pluto are open to receive the dead. The same cause therefore, viz. the humidity of the subsoil and evolvement of *that something* in consequence thereof which under its normal condition favors the advent of the intermittent type of fever every year in a mitigated form, when intensified as would necessarily be the case when the humidity of the soil is aggravated by obstructions offered to the surface drainage of a village during the rains, and thereby allowing it to be wholly absorbed in the subsoil, would usher in the fever in an epidemic form. We would entreat those who are engaged in enquiry into the cause of this epidemic to bear this significant fact in mind, inasmuch as all their investigations are sure to prove disappointing if they start with an idea that the fever met with in the epidemic villages is a stranger to the land.”

I would draw your Honor's particular attention to the fact I have especially noticed in stating my opinion as to the causation of the epidemic fever of the malarious type as shown in the first quotation, viz. “ that it is the inordinate humidity of the subsoil of *towns* and *villages* and not of the *paddy-fields* and *jullas* which contributes to the outbreak of the fever with epidemic intensity.” If it were otherwise, the task of removing the cause of the fever would be quite a hopeless one, nor would I have ventured to address your Honor on the subject. The following is what I have said on this point on page 42 of the pamphlet in reply to those who hold that subsoil drainage and the drainage of beels and paddy-fields are the only means by which the outbreak of the epidemic fever in this country can be prevented : “ To account for the epidemic you are not therefore to look to the soil of the rice-fields or of the beels, but to that of the villages themselves—and if it is water-logged, the true remedy, as in the other case, is to be found in the removal of the obstructions which have been offered to the drainage course of a village, and not in subsoil drainage. For, however humid or water-logged the soil of a village may be, it will, under the scorching sun, but without the aid of any subsoil drainage, be perfectly dry by April, when also the epidemic fever, however virulently it may have been raging, will of itself begin to abate. To prevent a recurrence, we have only to restore the natural drainage of the villages, and they will, without any other treatment, return to their normal condition. In fact, the application of subsoil drainage to Bengal with its periodical rainfall of 80 inches, the rivers full to overflowing during the monsoon, and three-fourths of its arable lands under water at least during four months of the year, and relying upon it as a sovereign remedy for the eradication of the disease, appears to us as reasonable as the conduct of the man who waited in expectation of fording the river when it would become dry during ebb-tide. The undertaking recalls to our mind the feat of our ancient sage Agastya, who is said to have brought the sea into the hollow of his palm and then drunk it off.”

The above is subscribed to by no less an authority than Dr. M. Von Pettenkoffer of Munich, as the following extract from his letter to Dr. L. Salzar of this city, and published as appendix, No. 3, to the pamphlet, will show: "To me, as to the author (meaning myself), it always appeared that the dwelling ground of the people has much more to do with the origin of the disease than has the surrounding district or land, as rice-field, marshes, &c." Sir George Campbell, during the latter part of his administration, was, upon close enquiry instituted upon this subject through Colonel Haig and others, so strongly impressed with this fact that he went even to the length of asserting that "in these reeking swamps (meaning the beels, jullas and paddy-fields) the human race seems to have multiplied to a greater extent than anywhere in India, perhaps in the world."

Dr. French thus remarks in his pamphlet on the "Burdwan Fever" (page 55): "I generally remarked that the villages in the vicinity of a large jheel (small lake) suffered very little, if at all, from the fever. This is owing to the fact that from the jheel the level of the land rises to the village site, and in consequence there is free drainage from the village into the jheel and thence into the khal and river." Thus Your Honor will observe that the opinions at one time entertained, both by medical men and engineers, as to the beels, jullas, and paddy-fields of the country being the generating cause of the fever in its epidemic form has been proved to be totally unfounded.

I beg to be permitted to state here the process of enquiry which led me to the conclusion "that it was the abnormal humidity of the subsoil of villages, and not of paddy-fields, consequent upon obstruction offered to the drainage which they normally enjoyed, which caused the endemic fever of the country to break out in those villages with epidemic intensity."

In the year 1864 a Commission was appointed to enquire and report upon the causes of the fever, which since some years was raging epidemically in some of the villages in the districts of Hooghly and 24-Pergunnahs. As a member of that Commission I visited a large number of the fever-stricken villages with a view to elicit such information from the villagers as might throw light on the subject-matter of our enquiry. Amongst other questions, I asked the villagers whether they observed any thing unusual in the physical peculiarities of their respective villages, and the answer I invariably received was that their houses had become unusually damp since the outbreak of the fever in an epidemic form, and related many significant facts corroborative of the same. This peculiar feature of the fever-stricken villages corresponded exactly with what I observed in Cossimbazar, which was almost depopulated (*vide* Appendix of the Pamphlet) by the outbreak of this type of fever in an epidemic form some 90 years ago, and which was still in a chronic state of unhealthiness. The exact similitude of this feature of the fever-stricken villages with that of Cossimbazar struck me at once, and led me to conclude that this unusual dampness must be intimately connected with the cause of the fever.

My next enquiry was devoted towards the drainage condition of the fever-stricken villages, as this abnormal dampness must, I concluded, be owing to excessive or unusual absorption of the periodical rainfall in the subsoil of those villages. As nature has blessed or cursed this land with a periodical rainfall of 60 to 70 inches within three or four months, she has also provided it with a beautiful and simple drainage system whereby to get rid of this large quantity of water from the village sites. The natural drainage system of the country as I have stated on page 5 of the pamphlet is as follows:—

"The drainage of all the villages in the epidemic districts, as elsewhere in Lower Bengal, is effected by the water first running into the nearest paddy-fields lying in the direction of their slope; thence it collects in the *beels*, from which it rushes through *khals* into larger streams, which again communicate with navigable rivers. An obstruction occurring in any one of these conduits must interfere with the drainage, and its effects are felt more or less according to the proximity or remoteness of the obstruction from the scene of its influence. Accordingly, it has been found, as will be noticed more particularly hereafter, that the stoppage of the mouths of the different streams has not been productive of such serious consequences to the villages lying within their influence as when the same occurred more in the vicinity of those villages."

There is scarcely a single village in Lower Bengal which has not a paddy-field or beel adjoining, or in close proximity to, it indicating at once which way the slope of the village runs. We also know, as an undeniable physical fact, that the river-bank being high, the slope of the villages lying on it is necessarily inland. Bearing these physical peculiarities of the country in mind, one can easily trace, without taking levels or calling in the aid of a professional engineer, whether any obstruction has been offered to the drainage of a particular village in its flow to its natural outfall.

In prosecuting my enquiry into the drainage condition of some of the fever-stricken villages according to the laws stated above, I found in every instance not only that obstruction had been offered to the flow of the monsoon water from the village to its natural outlet, but that the virulence of the fever and the interval which preceded its outbreak were regulated according to the proximity or remoteness of the obstruction from the scene of its influence.

That the conclusions I have been led to from close observation and analysis of facts are quite in accordance with scientific opinion on the subject will appear from the following extract from the "Retrospect of Medicine" edited by Dr. W. Braithwaite: "It is an established fact that the presence of vegetable matter is by no means necessary for the production of malarious disease. Ample proof of this is cited by Dr. Watson in his "Lectures" and by Mr. Martine in his work on "Tropical Climates." The former adopts the plain conclusion

that, "for producing malaria, it appears to be requisite that there should be a surface capable of absorbing moisture, and that this surface should be flooded and soaked with water, and then dried; and the higher the temperature, and the quicker the drying process, the more plentiful and the more virulent (more virulent because flooding more plentiful) is the poison that is evolved." Again, "there is reason to believe that the flooding of a porous earthy surface with water, and the subsequent drying of that surface under a certain degree of heat, constitute the sole or main conditions of the generation of the poison." I need not say that the conditions requisite, according to above opinion, for the production of malaria are to be met with in this country in a superabundant degree. We have the periodical rains flooding the surface of the country with water, the soil porous enough to absorb that moisture, and a powerful sun to dry the surface. Such being the scientific opinion as to generating cause of malaria, and its correctness being so conclusively testified to by the prevalence, as observed elsewhere, of that type of fever every year in this country after the close of the rains (jamastaka), it cannot be unreasonable to suppose, aye, the inference is irresistible—that the same cause which contributes to the propagation of the fever in this country in an endemic form, must, when intensified, cause it to break out with epidemic virulence. What, it may be well asked, can more contribute to the aggravation of the humidity of the subsoil, the generating cause of the fever, than obstructions offered to the drainage of a village? If, with all the facilities offered by the natural drainage system of this country, supplemented by artificial improvements, every town and village more or less suffer from fever of the malarious type every year after the rains, because with a rainfall of 60 or 70 inches within three or four months, a portion of it cannot but be absorbed in the subsoil, will not the generating cause of the fever be considerably aggravated, if by obstructions offered to drainage, almost the whole, at least the bulk of the rainfall not finding its way into its natural outfall is necessarily absorbed in the subsoil of a village? And this has precisely been the case, as shown by many striking instances I have mentioned in my pamphlet, wherever the fever has broken out in this country with epidemic virulence. So far as Lower Bengal is concerned I would supplement the above theory as to the generating cause of malaria by adding, that as malaria is produced by the drying up of the earth saturated with water, so it is almost entirely eliminated by the complete drying of the subsoil, which is effected by the middle of April, when even the paddy-fields begin to crack, and when patients heretofore suffering from fever begin to recover without the help of medicine, except in cases complicated with the enlargement of the spleen and liver.

I would not trespass on your Honor's valuable time by reproducing any of the many striking instances I have mentioned in the pamphlet, showing how obstructions offered in various ways to the drainage of particular villages had been invariably followed by the outbreak, therein, of fever of the malarious type with epidemic virulence. I should only mention that, notwithstanding enquiries of the most scrutinizing character from time to time, instituted by the local authorities evidently under the instructions of the Bengal Government, to test the correctness of the facts mentioned by me, as would appear from a report of such enquiries published in the *Calcutta Gazette* of 16th February 1873, not a single fact has yet been successfully controverted.

The only instance in which attempt was made to test the correctness of my theory by actual experiment was in the case of Dwarbashini, stated at length on pages 24 and 25 of the pamphlet. The obstruction offered to the drainage of that very large and important village, in the manner mentioned by me, and which, as an inevitable consequence was followed by the outbreak of the fever with epidemic virulence, was removed under the orders of Mr. Montressor, the then Commissioner of the Burdwan Division, at an expense of only Rs. 300, and it resulted in complete success (vide *Calcutta Gazette* of the 20th December 1865), proving at the same time with what comparatively small expenditure the cause of the epidemic fever could be removed and the fever-stricken villages restored to their pristine healthiness.

Although, as observed above, it was only in the case of Dwarbashini that my theory was practically tested, still ample testimony to its soundness is borne in other ways by medical men and others who have devoted attention to the subject. I beg, with your Honor's permission, to mention two instances. In tracing the cause which, according to the laws enunciated by me, must, I thought, have contributed to the depopulation and ruin of many cities and towns,—Gour for instance in olden times—by the outbreak therein of this type of fever in a virulent form, I stated as follows in pages 19, 20, & 21 of the pamphlet to account for the cause which had reduced the once healthy towns of Berhampore, &c. (Berhampore would not have been selected for a military cantonment unless it was healthy), to a chronic state of unhealthiness ever since some 60 years. "As regards the Dutch and the French Settlements of Kalkapore and Furrasdanga, those places are also situated on the same side of the river with Cossimbazar and in a continuous line with it. The presence of a beel, called Bistopore or Kalkapore beel, to their south-east plainly attests that the drainage of those places must at one time have passed into it, while that of a pucka road between the beel and the towns, and of another between the beel and its natural outfall, the Gobra nulla, likewise attests how completely the drainage of those places had been, and still is, intercepted by those roads. All these places are still in existence, with the same type of fever prevailing in them, though the disease is not so fatal to the residents as to newcomers. Adjoining Furrasdanga to the south, are situated, in a continuous line, the famous town of Sydabad, the old settlement of the Armenians, Khagra, the native town of Berhampore, famous for its brass cups and plates, and the cantonment of Berhampore itself. All these places drained themselves into the above named beel—Bistopore,

the last through a series of tanks. In all these places fever of the malarious and intermittent type have prevailed endemically since the last 50 or 60 years, though never in that virulent form which caused the utter depopulation of Cossimbazar, Kalkapore, Furrasdanga, Choona-khally, and Bhatpara. The cause of this chronic unhealthiness is not far to seek. Beel Bistapore, which is the drainage receptacle of all these places, like beels Chaltia, Chandor, and Bhouda, lying to the south and south-east of it, emptied itself through Gobra nulla into the Jellinghy, until an embanked pucca road from the city of Moorshedabad to the cantonment of Berhampore, constructed some 50 or 60 years ago, completely cut off its communication with this nulla or channel, and converted it into a lake without communication with any outfall. As is naturally to be expected from such a state of things, the beel becomes quite full after a few heavy showers of rain at the commencement of the monsoons, when, having no outlet for its overflow, it refuses to receive the surface drainage from the above-named places, and the monsoon water consequently is absorbed in their subsoil. Hence it is that the unhealthiness of those places every year, after the close of the rains, bears a direct ratio to the rainfall for the year. It is true enough that there are two sluices constructed in the embankment which protect Berhampore from the inundations of the Bhagirathi, and are evidently designed to carry off the overflow of the beel into that river; but it so happens that during the monsoons the water-level of the Bhagirathi is higher than that of the beel, consequently the sluices do not answer the object for which they were designed. It is to us unaccountable that these simple facts have never been noticed, and the drainage of the places have not been restored. This restoration can be accomplished easily and at no great expense, simply by restoring communication of the beel with the Gobra nulla by means of a sufficiently wide and deep drain. Though belonging neither to the profession of medicine nor of engineering, yet we can safely guarantee the recovery, by the places named, of their original healthiness if our simple suggestion be adopted. The improvement, we warrant, will follow within two years of the completion of the proposed drain." It so happens that a drain similar to the one recommended by me in the above extract has been cut, and with what success will appear from the following quotation from page 308 of the report of the Sanitary Commissioner for Bengal for 1872, published at the latter end of 1874.

"In Berhampore, a notoriously moist and unhealthy station, situated 4 feet below the high flood-level of the Bhagirathi, and protected from inundation by a bund, a drainage scheme, devised by Mr. Wickes, the Executive Engineer, and involving no great amount of outlay, received the sanction of Government in August, and has since been partially completed.

"The plan, which will easily be understood from the accompanying map, consists in cutting a drain of adequate depth from the barrack square, one of the lowest levels in the station, to the river Gobra about six miles distant to the eastward. In its course, which is that of the natural dip of the land, this drain taps and carries off the surplus water from two enormous beels—the Chandor and Bhylar beels—east of, and contiguous to, the sepoy lines.

"The original scheme contemplated the construction of a branch channel to drain the jail site, but the jail having been removed, this was no longer so necessary, and has been given up.

"The result of the work appears to have been most satisfactory, and not only has the station been rapidly and effectually drained, but the water has been made use of during the past year of scanty rainfall to irrigate 1,700 beeghas of land which would otherwise have been comparatively unproductive.

"In 1871, for want of such a drain as this, the whole of the sepoy lines, the race-course and parade-ground were under water for a month or six weeks, and a great deal of malarious fever prevailed in and around the station.

"There was a similar, but less extensive, inundation in 1856.

"It is believed that this work, which cost only Rs. 15,000, will have the effect of entirely preventing such collections of surface water in the station and its vicinity in future.

"It is very desirable that the unhealthy condition of Cossimbazar, a perfectly pestilential locality about three miles north-east of Berhampore, should be remedied: it is purely a question of drainage and conservancy. If the proprietors will do nothing, it would be well to include the place within the Municipality, and tax them sufficiently to enable the observance of conservancy rules to be enforced. The people live in a state of chronic fever; all the children have spleen, and though one at least of the landed proprietors (the Rani Surnomoyi) is very charitable, and gives freely both medicine and food, these can only be considered as palliatives. The place should be drained, the tanks cleansed, and the excessively filthy habits of the people put an end to."

It does not appear from the quotation whether the drain in question is connected with beel Kalkapore. For reasons stated by me, the success of the experiment, although so far as it goes flattering to me, will not be complete unless the connection is made, and the beel Kalkapore thereby relieved of its surplus water by its flow into the Gobra nullah, and the beel in question thus enabled to receive the drainage of Berhampore, Khagra, and Sydabad, of which it is the natural drainage channel in years of heavy rainfall. The following was written by me in regard to the outbreak of the epidemic fever in Jessore:

"We will conclude these remarks for the present by giving an instance of how an important town has partially recovered its healthiness by the partial restoration of its natural drainage. On the south and west of the river Bhoirub is situated the town of Jessore, with its drainage receptacle, the beel Harina, lying to the south-west of it. A road, called the Dacea-road, constructed it is said about 60 years ago, runs along its south and western boundaries, intercepting the drainage of the town in its way to the beel. How unhealthy Jessore

has been for a long course of years is well known. Although we cannot ascertain the exact year in which the above road was constructed, yet we make ourselves bold enough to say that the unhealthiness in question dates within a year or two of the construction of the road. The correct information on the subject cannot, however, be unavailable to the Public Works Department, and we shall be glad to stand corrected in the matter. Cholera is said to have been first introduced into this country from Jessore, and its handmaid—the malarious epidemic fever,—after committing a frightful havoc about 50 years ago, settled down in Jessore endemically, as in Cossimbazar and its neighbourhood. Not a soul could be met with there who had not a sickly tumid belly and lanky extremities to present. All the laws of sanitation known to the authorities, from the filling up of holes and dirty tanks, to the cutting up of jungle, had been experimented upon and exhausted. So much so that, with the exception of a few coconut trees, not a single old tree of any kind could be met with in the place within a few years of the breaking out of the disease. The natural drainage course of the place, when intercepted by the intervention of the road in question, had been attempted to be diverted towards the river on which the town is situated, but ineffectually, as the river was not tidal there, and was so constantly full to overflowing during the rains that, instead of receiving the drainage, it would very often inundate a portion of the town itself. Thus a new evil was brought on, and the authorities leaving aside the question of sanitation, had to direct their attention as to how to protect the town from inundation. Towards the latter end two drains were caused to be excavated, running parallel to, and at some distance from, each other, and connecting the river Bhoirub with beel Harina, thereby affording a vent to the overflow of the river into the beel. But the drains in their course to the beel passed through the town, and thus the natural drainage of the place, which had been obstructed by the Dacca-road, was accidentally, though only partially, restored. The immediate consequence was a considerable improvement in the sanitary condition of the town, which has lasted ever since. No one that we are aware of has noticed this; and there may be persons disposed to attribute the improvement to tank-filling, jungle-cutting, and other forms of folly and extravagance which have acquired such unenviable notoriety of late. The improvement, however, will be only complete when the drainage channels of the place, which are yet directed towards the river, are diverted to the two drains."

The following quotation from Dr. Unnodapersad Kastogiri's prize essay on the "Epidemic Fever of Bengal" will show how thoroughly correct I was in my supposition that the construction of the Dacca-road was the cause of the outbreak of the fever in Jessore, inasmuch as its presence I found intercepted the flow of the drainage of Jessore to its natural outfall—the beel Harina.

"In 1834-35," says Dr. Kastogiri, "the Government commenced the construction of a road from Furreedpore to Jessore by convict labour. In 1836 the road progressed as far as Mahmoodpore, between it and its drainage outfall into the Keshwar bheel, as far as Harekistopore, a mile to the south-east of Mahmoodpore. Fever of a virulent type broke out after the ensuing rains, both in Mahmoodpore and among the 700 convicts working on the road; of the latter 200 are said to have died in a short time, on account of which the work was abandoned. Mahmoodpore was entirely deserted. It is now an insignificant village still containing many remnants of its old magnificent buildings."

"On the Nudde side the road mentioned before had progressed as far as the Sudder Station of Jessore, its south cutting off on its drainage outlet into the Harina beel, when fever of a destructive character broke out there. In short, the road, popularly called the *Dacca-road*, brought disease and death along its progress into the villages, the drainage of which it obstructed—a positive fact in support of the obstruction of drainage and of outbreak of severe fever following each other as cause and effect."

It is evident from the above that it was not in Jessore alone that the fever broke out in a virulent form, but also in other places, the drainage channel of which had been likewise intercepted by the road in question. The following extract from Mr. Westland's report on Jessore, given in the report of the Sanitary Commissioner of Bengal for 1874, fully confirms the statement of Baboo Unnodapersad about the year, the road was constructed. Mr. Westland says, "great sickness broke out here in the year 1836, when the Jessore and Furreedpore road was being constructed by means of convict labour. It was a fever begun with a headache, causing internal heat, and carrying off the victims in about ten days. It continued here seven years and desolated the place." (*Westland's Report* page 273.) This concurrence of testimony is worthy of note.

In conclusion, I beg to quote the following from paragraph 6 of the pamphlet to show why is it that the endemic fever of the country has been raging with epidemic intensity much more extensively of late years, especially in the districts of Burdwan, Hooghly, and 24-Pergunnahs. "Have not a large number of roads, as railway feeders or as ordinary highways, been constructed in both the affected districts during the last fifteen years,—not to mention the railway,—most of them crossing the drainage channels of villages? Further, have not many important khals, the drainage channels of villages, been closed by those roads, unprovided as a rule with culverts at the site of those khals, and have not many of them been likewise dammed up for the purpose of retaining water on their rice-fields by the zemindars, ignorant of the mischief they were thereby doing?" The above view is fully supported, as regards his own district, by the Civil Surgeon of Hooghly, as the following quotation from page 90 of the report of the Sanitary Commissioner for 1873, will show:—"The main cause to which attention has of late been mostly directed is the subsoil drainage; and there can be no doubt to any one who has studied the subject, that the natural drainage of the

country has been interfered with in many ways of late years; amongst those may be mentioned the many embanked roads that have been thrown up during the past sixteen years. These roads must materially interfere with the drainage of a country, whose inland communication was principally by water; these roads must also very materially influence the drainage of the villages near which they pass." To convey to your Honor a proper idea of the present condition of most of the villages in the districts of Hooghly, Burdwan, and 24-Pergunnahs I beg to quote the following from the letter of a correspondent of the *Indian Mirror* of 15th January last, under the signature of "A HOMELESS MAN."

"Within a few miles of the seat of Government—that is, on either side of the Hooghly north of Calcutta—may be seen one continued scene of human suffering, caused by a fell epidemic whose ravages every year during this time are most fearful. So great indeed is the calamity felt, that those who have the means to remove have removed to Calcutta and elsewhere for the safety of their lives, while others have taken refuge under the roof of relatives and friends. Helpless men, women and children are left in the midst of the epidemic; and who can save them? Pale, emaciated, skeleton-like sufferers as they are, they one and all are under the baneful influence of spleen and fever, which at times attack them and contribute to the acceleration of their death. The houses are the habitation of owls and pigeons and wild beasts for want of human dwellers. I may, with propriety, call these "The Deserted Villages," concerning which a Goldsmith might find ample materials for thought and writing. What population there is, is made up of persons whose means do not allow of their removal from the place, and these form chiefly the rural population. Such is the state of things observable within a few miles of the metropolis of British India; and who really ought to inquire and try and remove if possible the sufferings indicated above? Most assuredly the paternal Government under which we have the good fortune to live. It may be that epidemics and such like calamities are Providential visitations; still it is the duty and business, if human effort could do it, to try to relieve suffering humanity. And this relief is, as matters at present stand, loudly called for. Will the Government of the Hon'ble Ashley Eden, than whom no Lieutenant-Governor ever was more conversant with the requirements of our province, give a cordial response to our appeal? I hope and trust it will." From my own personal knowledge of many of these fever-stricken villages I fully subscribe to the above.

As already observed, the cause of this most deplorable state of things is, in my opinion, easily preventible. In 99 cases out of 100 the cause is traceable to obstructed drainage; and as the drainage of this country is not subsoil, but is effected by the monsoon water running over its surface, such obstructions as may have been offered in its flow to its natural outfall can be removed at a comparatively small cost, as has been already seen in the case of Dwarbashini. I would therefore, by way of experiment, humbly propose that the line of villages from Bon-Hooghly to Barrackpore, situated between the river Hooghly and the Barrackpore-road, should at once be taken in hand, and the cause of obstruction to their natural drainage be removed before the rains set in, so that the result of experiment might be known after the close of the ensuing rains. All these villages, like Calcutta, are situated on the eastern bank of the river, consequently their drainage level must be towards the east, and this fact is likewise attested by the presence of the paddy-fields in that direction, viz. on the east side of the Barrackpore-road. The drainage of all these places used to pass into those paddy-fields through a number of culverts in the Barrackpore-road, and thence to its outfall, the river Hooghly, by means of two khals, viz. Datear khal and Khurda khal. Since some years the construction of municipal roads in some of these villages crossing their drainage channel, the silting up of the drains on either side of the Barrackpore-road in consequence of their not being periodically cleaned out, and finally, the different culverts in the road having been choked up, the rainfall over those villages cannot find its way into its natural channels of outlet, and is almost wholly absorbed in the subsoil of these villages. As a necessary consequence all those places are suffering from fever of the malarious type. Any engineer of ordinary intelligence and knowledge of his profession could easily trace the obstructions, and the same, I dare say, may be removed at a small cost. I beg to submit herewith a rough sketch indicating the drainage level of the villages in question.

It is already too late in the season, or I would have also proposed as a trial ground the whole group of villages from Ichapore to Chagda, numbering some twenty or twenty-five, where the fever broke out with the greatest virulence in the year 1860, 1861, and 1862—that is, immediately after the construction of the Eastern Bengal Railway embankment, and the different places were affected in the order of time the embankment in question passed along them in course of its construction, intercepting the drainage of those places in its flow to its natural channels the beel Barrotee and beel Mathoora.

I take this opportunity to bring to your Honor's notice that at my recommendation the Hon'ble Mr. Cockerell issued instructions to the Joint-Magistrate of Serampore, some time last year, to clear out the drainage of my native village Connuggur, situated within that sub-division, and suffering since some years from this type of fever. The work was taken in hand, but very little progress was made in it, as it was commenced upon rather late in the year. The work however has not been since resumed. Dr. Green, the Civil Surgeon of the sub-division, has very attentively studied the drainage condition of the place. I would therefore respectfully beg that your Honor will be pleased to issue necessary orders for the removal, under the supervision of Dr. Green, of the obstructions offered to its drainage.

No. 1424 (Sanitation), dated Calcutta, the 17th April 1878.

From—D. BARBOUR, Esq., Offg. Secy. to the Govt. of Bengal, Financial Dept.,
To—The Sanitary Commissioner, Bengal.

I AM directed to forward herewith copy of a letter, dated the 9th instant, from Rajah Digumber Mitter, c.s.i., explaining his views as to the causes of the epidemic fever which from time to time appears in different parts of Bengal, and containing suggestions for its prevention. The Lieutenant-Governor is of opinion that the Rajah's conclusions are perfectly sound, and he will be glad to know how far they are borne out by the results of your examination of the districts of Rungpore and Dinagepore. I am also to request that if you concur in the Rajah's views, you will be good enough to draw up a circular to District Magistrates, inviting their special attention to the subject, and pointing out how much may be done to improve the health of towns and villages by opening out obstructed drainage at a small cost.

RESOLUTION—By the Government of Bengal, Financial Department, dated the 29th April 1878.

READ—

A letter dated 9th April 1878, from Rajah Degumber Mitter, c.s.i., explaining his views as to the causes of the epidemic fever which from time to time appears in different parts of Bengal and containing his suggestions for its prevention.

Read again—

Government circular No. 28, dated 7th August 1877, regarding the improvement of the drainage of towns and villages in Bengal with a view to preventing the unhealthiness caused by obstructed drainage and consequent dampness of the sub-soil.

The improvement of the drainage of towns and of village sites is a subject to which the Lieutenant-Governor attaches the greatest importance, and in his opinion there is no room for doubt that one at least of the chief causes of unhealthiness in Bengal, and of the fevers which in late years have done so much injury and have caused so much misery, suffering, and mortality among the people of large tracts of country, is the excessive humidity of the soil caused by obstruction to drainage.

2. The obstruction is no doubt in some cases caused by roads, railroads, or embankments, and it is the duty of the Magistrates, as well as of all other officers possessing local influence or authority, to see that such obstructions are remedied by the provision of a sufficient amount of waterway by means of culverts and bridges. The value of these culverts and bridges is much enhanced when they are accompanied by drains leading into them constructed along the sides of the obstructing embankment, and when care is taken to secure sufficient drainage on the lower side of the embankment to carry off the water to the nearest beel or river.

3. But the obstruction to drainage caused by artificial means is of trifling importance in comparison with the natural obstruction caused by the silting up, or destruction in other ways, of old water-courses, through which the surplus drainage from the villages flowed to the neighbouring lowlands, and the surplus water of these lowlands was carried into rivers or other natural outlets.

4. Experience in a number of large stations has lately shown that fever has been not unfrequently brought into such places by an entire indifference on the part of the local authorities and of Municipal bodies to the important question of obstructed drainage, and that thereby excessive suffering and mortality have been caused. There is no doubt very great truth in the theory, which has so often and so strongly been insisted upon by Rajah Degumber Mitter, that the natural course of the drainage of Bengal villages is too often overlooked in investigating the causes of outbreaks of fever. The natural condition of that drainage is very correctly described in the following paragraphs of the Rajah's letter of 9th instant:—

" My next inquiry was devoted towards the drainage condition of the fever-stricken villages, as this abnormal dampness must, I concluded, be owing to excessive or unusual absorption of the periodical rainfall in the subsoil of those villages. As nature has blessed or cursed this land with a periodical rainfall of 60 to 70 inches within three or four months, she has also provided it with a beautiful and simple drainage system whereby to get rid of this large quantity of water from the village site. The natural drainage system of the country, as I have stated on page 5 of the pamphlet, is as follows:—

" ' The drainage of all the villages in the epidemic districts, as elsewhere in Lower Bengal, is effected by the water first running into the nearest paddy-fields lying in the direction of their slope; thence it collects in the beels, from which it rushes through khals into larger streams, which again communicate with navigable rivers. An obstruction occurring in any one of these conduits must interfere with the drainage, and its effects are felt more or less according to the proximity or remoteness of the obstruction from the scene of its influence. Accordingly, it has been found, as will be noticed more particularly hereafter, that the stoppage of the mouths of the different streams has not been productive of such serious consequences to the villages lying within their influence, as when the same occurred more in the vicinity of those villages.'

" There is scarcely a single village in Lower Bengal which has not a paddy-field or beel adjoining, or in close proximity to it, indicating at once which way the slope of the village runs. We also know as an undeniable physical fact that the river bank being high the slope of the villages lying on it is necessarily inland. Bearing these physical peculiarities of the country in mind, one can easily trace, without taking levels or calling in the aid of a professional engineer, whether any obstruction has been offered to the drainage of a particular village in its flow to its natural outfall.

"In prosecuting my inquiry into the drainage condition of some of the fever-stricken villages according to the laws stated above, I found in every instance not only that obstruction had been offered to the flow of the monsoon water from the village to its natural outlet, but that the virulence of the fever and the interval which preceded its outbreak were regulated according to the proximity or remoteness of the obstruction from the scene of its influence."

5. Under existing laws, Collectors, Magistrates, and Municipal bodies have ample powers for dealing with the evil. In the great majority of cases expensive works are not required: very often indeed the expenditure of a few hundred rupees will give relief to thousands of suffering human beings. No doubt it may be urged that, as the money expenditure in most cases would be so small, the sufferers might reasonably be expected to help themselves; but the knowledge which all Magistrates must possess of the habits of the people will satisfy them that associated labour for the public good is not generally to be expected in the present day from native populations. What is required to be done must for the most part be done either wholly or in part by public officers or public bodies.

6. The Lieutenant-Governor relies upon all Commissioners and District Officers to take up this matter in an earnest spirit. It is a subject in which the District Road Committees ought to be able to give much real and useful assistance, and even if their funds cannot be employed on such works, there is no reason why their engineering staff should not render valuable assistance in laying out and devising village drains, since they must often, in the course of their ordinary duties, come upon villages in which a small and inexpensive drain would render a whole village healthy.

7. Another subject which deserves the careful and anxious attention of district officers is the supply of good drinking water. Where public funds are not available, there will frequently be found men of public spirit ready and anxious to co-operate with the Magistrate in the excavation of tanks—a work which has always been looked upon in India as a work of merit. Large sums of money are expended in this way every year, but it is feared that much of it is wasted by the excavation of tanks in places where they are not wanted, while other places greatly in need of water are overlooked. In respect to the selection of sites for tanks, it is always in the power of the Magistrate to exercise a very useful and beneficial influence on those who are charitably disposed.

8. Whenever a really useful scheme is proposed to improve the drainage, or to provide pure drinking water, Mr. Eden will always be willing to assist district officers and public bodies by grants-in-aid to enable them to improve the condition of the people, so far as the funds at his disposal will permit. Considerable grants have already been promised this year for this purpose, and no more proper or legitimate mode of expending any surplus which may accrue from the Public Works Cess could be devised.

ORDER.—Ordered that a copy of this Resolution, together with a copy of Rajah Degumber Mitter's letter, be forwarded to all Commissioners for information and guidance.

No. 726S, dated Calcutta, the 23rd September 1879.

From—J. M. COATES, Esq., M.D., Sanitary Commissioner for Bengal,
To—The Secy. to the Govt. of Bengal, Financial (Sanitation) Department.

With reference to your letter No. 1424, dated the 17th April 1878, I have the honor to state that, on receipt of it, Dr. Harvey issued a circular to all Magistrates, a copy of which is herewith submitted, forwarding a copy of the late Rajah Degumber Mitter's letter of the 9th April 1878, containing his views with regard to the causes of the epidemic fever which appears in Bengal, and his suggestions for its prevention, inviting their attention to the subject, and pointing out how, by opening out obstructed drainage at a small cost, the health of towns and villages could be improved.

2. I now beg to enclose abstracts of the replies to this circular that have been received from the district officers. These abstracts contain the practical portions of their reports, and I forward them, instead of the original reports (which can be submitted if required), because the latter are too lengthy.

3. The delay that has occurred in submitting this report is due, in the first instance, to no report having been called for from this department in the original orders on the subject quoted above, and to my having to wait for the replies of several officers, which could not be sent until the local officials and native gentlemen in their respective districts could be consulted on the subject. As it is, I am unable to submit the reports from Mymensingh, Bhagulpore, and Nuddea, as I have not yet received them.

4. Dr. Harvey is much in accord with the Rajah, and considers that "the water-logging of the soil is the chief factor at work in producing the fever" referred to by the Rajah, and that "the main cause of the aggravation of the fever at Dinagepore was the obstruction to the drainage caused by well-meant endeavours to improve it."

5. The Rajah's views in his own words are—"The epidemic is solely due to something in the soil, and the condition most favourable to the development of that something is excessive

or abnormal humidity of the sub-soil." This view he qualifies by saying that "it is the inordinate humidity of the sub-soil of towns and villages, not of the paddy-fields and jullas, which contributes to the outbreak of the fever with epidemic intensity." This statement he also modifies when pointing out the remedy for this condition of things. We find him saying—"To account for the epidemic you are not therefore to look to the soil of the rice-fields or of the beels, but to that of the villages themselves; and, if it is water-logged, the true remedy is to be found in the removal of the obstructions which have been offered to the drainage course of a village, and not in the sub-soil drainage. For, however humid or water-logged the soil of a village may be, it will, under the scorching sun, but without the aid of any sub-soil drainage, be perfectly dry by April, when also the epidemic fever, however virulently it may have been raging, will of itself begin to abate. To prevent a recurrence, we have only to restore the natural drainage of the villages, and they will, without any other treatment, return to their normal condition. In fact the application of sub-soil drainage to Bengal, with its rainfall of 80 inches, the river full to overflowing during the monsoon, and three-fourths of its arable lands under water, at least during four months of the year, and relying upon it as a sovereign remedy for the eradication of the disease," he scorns as foolish and unreasonable.

6. With regard to the above view, I would submit the following observations:—That in April the villages are freer than at any other period of the year from obstructions to surface drainage, because in a few hours the rains at the vernal equinox sink into the sub-soil, or run off into the empty pools, tanks, and low grounds without water-logging the soil. Yet these rains never come all over Bengal without bringing a direct and large accession of fever and ague.

7. By irrigation we absolutely lead water into, and spread it over, the fields within and around villages; yet neither in Shahabad nor in Orissa has an increase of disease resulted by the measure. The Deputy Superintendent of Canal Revenue in the latter place reports that "no actual cases of fever or sickness have come to his knowledge," although he believes that "the moisture is calculated to injure those villages towards which percolation should go from the canals and their distributaries." Again, the inspecting officers of the Education Department and the District Superintendent of Police, who see more of the same district than others, have noted "no outbreaks of sickness from impeded drainage," that is, impeded by canal banks or otherwise.

8. There are innumerable villages all through South and Eastern Bengal to which the remarks of the Joint-Magistrate of Cuttack, with regard to Jajipore, viz. that "although it is a town thoroughly water-logged and without drainage, yet the inhabitants consider it one of the healthiest in Orissa, and malarial fever is extremely rare there," are equally applicable.

9. There are jullas which are not so harmless as the observations of the Rajah led him to believe. I refer to those which remain here and there in the course of old and dried-up river-beds. These "chains of pools," as they are termed, are specially fever-giving, although, as everywhere else, the Europeans who reside near them suffer less than the natives. The former, however, live usually in houses situated in open compounds free from accumulations of filth, use purer drinking water, and observe healthy habits, although in the matter of general drainage they are subject to the same conditions as the natives. Mr. Whitfield had to give up important surveying work in the beels of the 24-Pergunnahs. He writes—"One Assistant Engineer died, and surveyors, both Europeans and Natives, all suffered severely and were frequently ill with fever, and their men, brought from the surrounding villages, also became ill and refused to remain."

10. But a strong argument against a mere soil-and-moisture theory lies in the fact that, in places where the water is so excessive from inordinate rains or overflow of rivers as to flood and sweep the villages, the following drying season is unusually free from fevers.

This fact the Magistrate of Chumpon, in referring to his experience of the Burdwan fever in Hooghly, has well illustrated. He says—"There is a fall of 80 feet from the Damuda to the Hooghly, the Hooghly district lying between these two rivers, and that therefore the overflow from the Damuda used formerly to flood the whole of the district and actually reach the town of Hooghly, so that the people had to go about in boats. But the embanking of the Damuda and the diminished rainfall of 1874 caused the drying up of the country to begin as early as September and October, instead of late in the cold weather or even in January and February." The effect was that in 1875 he "saw the whole country dry, and the people obtaining water out of holes in the Saraswati, until the Damuda water was led into that stream that summer to the great relief of the people." Dr. Roy, whom no one among us had a more intimate and extensive knowledge of the fever which was so general and fatal in Burdwan during the late epidemic there, assures me that the higher villages suffered almost as badly as the low ones, and that the only ones that were so entirely free from the disease, that the people of themselves sent their families to them as to a sanatorium, were a few which were, during every rainy season, surrounded and flooded by the overflow of the Damuda. The same fact was recorded in the sanitary report of Maldah for the last year. Referring to the fever of the year, the Civil Surgeon writes—"This fever has assumed a new phase in becoming particularly fatal, insomuch that a similitude between it and Burdwan fever has been drawn; and to account for this change in character, the view has been propounded that, by the silting up of the river Kalindry, the influx of the Ganges water to that of the Mahanunda is so lessened that overflow of the latter river is so trivial as almost to be regarded as a circumstance of the past. This view claims for the inundated water a twofold benefit—first, replenishing the tanks; and secondly, washing away disintegrating organic matters. This view appears sound in theory and borne

out by facts. Since last year the country was little if at all submerged, and fever, in consequence of a most virulent type, pervaded the district, while during the present year the inundation was considerable, and fever, though nearly as prevalent as during the preceding year, was comparatively innoxious. I am inclined to believe that the washing of refuse matters from the vicinity of dwellings is the great preventive to fever of malignant type, and this I judge on the ground that immediately below the conflux of the Kalindri and Mohanunda, in the town of old Maldah, and in the villages Demaseri, Joto, Arrahapore, Kotwali, and Dhamtolla, respectively, situated on the left and right banks of Mohanunda, all of which were uninundated this year, fever was particularly rife and fatal." The Magistrate adds—"In the tracts lying near or abutting on the Ganges, when those parts of the country that urgently require a good continuous flushing in the rainy season and up to its close were well flushed by the rising of the Ganges in 1878, health has been remarkably good, and there has been an absence of fever, while there has been an epidemic of fever in those parts where these conditions exist, and remained unsatisfied at the proper time."

I myself have found the above facts to be correct over and over again during the last 20 years in this and other districts of Bengal, and all who have witnessed the first overflow through a village, and noted the black, brown, green, and yellow color of the water as it passes over drain and cess-pit, byre and ditch, and has smelled its most offensive odour, one easily observable some miles below the village, will have seen and felt enough to satisfy them of its good effects.

11. The introduction of river or other fresh water to village tanks, which has been done in Nuddea, Shahabad, Durbhunga, Mozufferpore, and Serampore, has proved distinctly beneficial to the health of the people, although this ought rather to raise the water-level in the soil of these towns.

12. Taking chlorine as the test of water contaminated by excreta—and it is the fairest because it is the most direct as to cause, and it is the least liable to chemical change—we find that, as recorded by Dr. Warden of Bhagulpore in the last *Medical Gazette*, the water of the Ganges contained 347 grains of chlorine per gallon; a well in Mr. Sandys' garden 994 grains; a well in Sujagunge Bazar 16·4 grains; another by the side of the road in Bengali Tolla 85·03 grains. This is an independent proof that foecal accumulations affect village wells, while the water in an English gentleman's compound is comparatively free from such impurities, though the places adjoin and the drainage is the same in both, that is, the natural outlets are kept open.

13. Again, the *Sonthals* and the *Polis* suffer little from fever as compared with the Hindus residing in the villages in their neighbourhood, and the difference does not lie in the drainage nor in the dampness of the houses. Both the former live in straggling huts; never in densely-packed villages. They cultivate the soil up to their house sides, so that when the *makai* is ripe one can only see the roofs of their huts. There are no well-privies inside the houses, and no cess-pits, foul drains, human or cattle excreta accumulations around them. All these are common in the Hindu villages, and contaminate air, soil, and water.

14. Take again the strong and vigorous people inhabiting the low lands of Chittagong, Noakholly, Burrisal, and the islands of Sundeeip, Hattia, and Dukhin Shabazpore, through whose villages I travelled extensively after the cyclone of 1876. These people rarely have fever or spleen, yet the sub-soil water is so close to the surface that they cannot dig tanks or wells because the water would be brackish. They generally obtain their drinking water from tanks whose walls are built up by outside cuttings and are made to receive rain-water. When I asked them why they buried their dead on the banks of these tanks, they pointed to the rice-fields and said, "if we dig down three feet, we would put our dead in water, and as we plant up to the edge of our *baris*, we have no other dry place." These people have no large villages, and their *baris* are only four or five houses. Here again we have much moisture and no drainage; but we have small hamlets, extensive cultivation, and little contamination of soil or drinking water. Our *lascars* are born and bred in these villages, and their physique proves their healthiness.

15. But of all the peculiarities I know of, the one which more directly applies to the subject we are considering, and is the most apt and pointedly important, is the occupation of new lands, or *churs*, as they are termed, in these same districts. The khals, which extend in some instances 40 miles inland, as well as the rivers Megna, Poddar, and others, bring down mud and organic debris from the hills and plains of the far interior. These are deposited in long shoals, grass grows, and layer after layer of this clay, sand, and humus are added till they are above rainy season water-level. I have over and over again asked the farmers why they do not build and inhabit these churs as soon as they begin to cultivate them, and the unvaried answer was that experience has taught them that if they did so at first, they would die of fever; but that after they have cultivated the ground for three or five years, they can then build and live on it in health.

Here drainage is again unchanged, and indeed, is impossible, yet the soil is destructive to life until its organic impurities are taken out by a succession of growing plants.

16. The inference from these facts is surely irresistible, viz. that it is not more or less of moisture that is the cause of the evil, but the decomposable impurities of the soil, and that our attention should rather be directed to the latter than the former, follows as a thing of course.

17. A word about the drainage of the ordinary Bengali village itself. It is dug out of the common rice field level of the country. Holes are left owing to the mud of the floors and walls of the huts having been taken from them; tanks are dug also, and when the road has been worn below mean level, it is repaired with earth taken from excavations made alongside,

which leave hollows and ditches of irregular width and depth rarely connected with each other so as to form one continuous drain. Now these tanks, cess-pits, hollows, and ditches are the drainage reservoirs of the village, and as their deepest parts are below the level of the fields around, they cannot be thoroughly drained away. When the village has become older and larger, wells are dug in order to save excavations; they are usually begun in one of these hollows or roadside ditches, and as there are well-privies inside the enclosure of the houses for the females, and as the cows are fed outside or in the *angan*, their droppings, the house-sweepings, the cooking fluid refuse, the excreta of children, &c., &c., are cast or flow outside, rise into middens, fill the cess-pits, and overflow into the ditches and hollows, fouling the wells and tanks, and raising portions of the village soil above field-level, but yet leaving the unfilled hollows still below the ordinary field level, and in a great measure undrainable into the waterways in the neighbourhood.

18. The Rajah is right when he says we cannot apply sub-soil drainage to Bengal, but he might have gone further and noticed that we cannot drain our village pits, hollows, and ditches which are below the level of the fields around. I find that the only removable obstructions to the natural surface drainage of our villages are the uncultivated portions which have been left between one ditch, hollow, or excavation and another, the growth of weeds in the ditches occasionally, the position of wells in roadside drains, the building of shop verandahs or steps over street drains in towns, and the mats, bamboo reeds, and low ridges put up by men and boys for fishing purposes in the neighbouring waterways.

19. Here I cannot help alluding more prominently to the germ theory of disease, because, if true, it may be that very something in the soil which the able and astute Rajah has surmised to exist; and, if not true, the organic matters on which the germs feed may be the evil in question. At any rate the latter is the evil that I contend must be got rid of.

Mr. Lister prevents live germs getting at a wound, whether accidental or induced, by the interposition of an antiseptic, and he thus quite prevents putridity and septicæmia. But there are so many germs and various forms of fever that we are as yet unable to distinguish which germ is the special source of evil. However, even on this point, we are breaking ground and attaining accuracy, for Mr. Lister has already discovered the germs which cause rancidity in milk, and if that one be excluded, though others be present, the milk will decay, but not change into lactic acid. M. Pasteur, again, has done more. He has separately isolated the germs, be they micro-zoon or microphyte, which cause carbuncle, which cause putridity of blood (septicæmia), and which cause cholera among fowls. At a recent meeting at Paris, he stated that "these maladies exist in the state germs bottled in my laboratory. At will, during two years for the first two and for several months for the third, these germs, always ready, can be poured out for new inoculation and new deaths." He adds that he has proved demonstratively that epidemic constitutions do not exist, and that what corresponds to this term is "a greater or less abundance of the germs of the disease."

When I was instructed by Government to set Dr. Wilkie to work on the Burdwan fever inquiry in 1874, I directed him to use the microscope in his investigations, and, doing so, he found the stagnant waters in and around the affected villages swarming with these organisms. The financial pressure that followed the famine of that time stopped the researches, and I can only regret that it has not again fallen to me to push on the inquiry further.

20. If we consider that tons of fecal and other decaying animal and vegetable matters are daily pumped through the sewers and carted and carried away by rail from Calcutta, and reflect that a like proportion of such matters remains in every village in Bengal, that they are continually accumulating and their decomposition is constantly going on, should we not expect that they, or the germs which feed, grow, and multiply upon them in incalculable numbers, would infect the air and the water, and enter the systems of the people? And may it not be that, when the water is in such excess as to flow through the villages, it carries with it all the soluble organic matters and much of them which are so light as to remain suspended, and that thus the water and the current really scavenge, scour out, and make these villages healthy, notwithstanding the excess of moisture and the fine deposits of organic matters which are left behind? I would just note that, in balancing the undecided question as to which is the more probable cause of these fever-germs or decomposing organic matters, the balance falls to the former. It accounts for a variety in the disease itself, also for the difference of prevalence in one season and year as compared with another, and for the subsidence of an epidemic for years, inasmuch as germs in their growth, development, and abundance vary very considerably, whereas organic matter remains accumulating, and is but little liable to change. Thus the Burdwan fever has gradually abated till it is now of the ordinary type, while drainage and sanitation are unchanged; and the like fever has occurred with Burdwan severity in several other districts, e.g., Maldah, Purneah, &c., which were previously little affected.

21. With regard to the other part of the subject, viz. the obstruction of drainage by roads, &c., causing disease, it cannot be accepted as a proof of this hypothesis that those who were employed in the construction of the Jessore and Fureedpore road died in considerable numbers. The food, the water, and the clothing used by them, and their exposure to sun, rain, and night-chills, to which they were subjected, may have had much to do with the result. At any rate the road is there still, and the villagers residing near it do not specially suffer from fever. The same theory is advanced to account for the mortality among the people who constructed the Grand Trunk Road in, if I remember aright, the Prison Committee's Report of 1839, written, I believe, by Lord Macaulay; but the same fact may be averred to rebut it, viz. that the villagers residing along this road, from Howrah to Lahore, do not since its construction specially die from fever.

I should observe here that agues were very common in England up to recent years, and it might be with truth asserted that this disease disappeared with the increase of road and railway lines. It may, however, be said that more bridges are made there than in this country. This I cannot admit, for engineers, taught in the same school, have constructed both, and the companies who made the former are not the men to put in one culvert more than they could possibly avoid. But that which has increased, consequent on the construction of roads and railways, is cultivation. To such an extent has this increase been as not only to take out of the fields the very organic matters I am now commenting upon, but to necessitate the employment in their place of manures and even guano from the antipodes. It is a fair inference, I submit, that the English agues have ceased with the using up by high cultivation of all past and present decaying organic matter or germ pollution. I should note also that these roadways were made and the agues ceased before village sanitation, except this using-up of organic matters for manures, was begun in England. The same progress in roads and cultivation is benefiting Italy, so notorious for its agues, although general sanitation in towns is more backward there, and that many of our Indian stations, and even the Terai itself, have become healthy and are still becoming healthier not from increased drainage, but from extended cultivation.

Returning to Indian roads, I should observe that if any of them have been made with deficient drainage, they would either, as mentioned by the Magistrate of Cuttack, "complacently yield to the floods and disappear," or the accumulated water would remain stagnant, and lean on or lie against the upper side of the road or embankment, and the opposite or lower side of the obstruction would be quite dry and free from water-logging. In my inspection tours I have been careful to note this very point, and to inquire into the comparative health of the people residing on either side of roads which cross the natural fall of the country. I have found the water not lying against them, but collected in hollows below the surface level of the fields, and equally so on both sides of them, and fevers in no instance kept to one side only. It was also a matter of constant remark by many independent observers that the higher villages suffered as severely as the lower ones in all the districts that were affected by the Burdwan fever; nor did it keep to the line of roads in any of the districts from Nuddea to Midnapore, and I have repeatedly found this to be the case elsewhere; moreover, fevers are often worst where there are no roads, as in the Terai.

22. Every officer in the Chota Nagpore Division reports that the natural drainage fall is so great that there is no obstruction, but that, on the contrary, the difficulty is to retain the water for agricultural purposes; and the Deputy Commissioner of Lohardugga says that in this district the fever is not attributed to obstructed drainage, but to the action of the sun's rays on the decaying vegetation of the vast forests in the district, and to extremes of temperature.

23. Considering all the above mentioned circumstances, especially the facts that we have less fevers after such an excess of moisture as to flood the country; that we have agues where the drainage is excellent, although decaying organic matters are abundant; and that cultivation alone does away with such matters altogether, I confess I am unable to explain the causes of the Bengal fevers, except in the manner above pointed out. I would then advocate that, in addition to removing as far as possible the drainage obstructions already referred to, which may be found in villages, the means of traffic be increased whether by canals, roads, or railways, so that by an extended cultivation, not only for home consumption, but for foreign export, all the village organic matters (collected by a proper conservancy from house and public latrines, from middens, drains, and cess-pits) may be applied to fields, used up and rendered harmless in the growth of plants; that these hollows, cess-pits, &c., be covered over with a layer of fresh earth taken from mounds of high places, if any, or evenly off a neighbouring field, and that the drinking water be protected from night-soil, kitchen fluids, surface drainage, &c. Improved dwellings, better clothing and sleeping arrangements, and healthier habits of life generally will gradually ensue.

24. The abstracts of the reports herewith submitted show that the attention to the subject drawn by the Rajah's letter has done much good. Some obstructions to drainage have been removed, and others are in the course of removal. It will be my duty continually to seek out more, to have them rectified, and to cause other improvements to be carried out wherever required as fast and as far as the means at command will admit.

Our municipal towns have already greatly improved, and the progress in general sanitation that continues to be made in them is marked and fairly rapid. In time we hope to attain a like success in dealing with our village population.

25. I should apologise for the length of this letter, but, as the subject is really the most important in the whole range of sanitation for Bengal, I felt I could not forward a bare epitome of the district reports without laying before Government a rapid survey of the question of the causes of our fevers, the condition of our villages, the possibilities of drainage, &c., and the facts supporting the views I have presented. I have endeavoured to be as largely practical and as little theoretical as the subject permitted.

Circular No. 45, dated Calcutta, the 15th May 1878.

From—ROBERT HARVEY, Esq., M.B., Officiating Sanitary Commr. for Bengal,
To—The Magistrates of 44 districts in Bengal.

I HAVE the honor to forward, for your consideration, copy of a memorandum by Rajah Degumber Mitter, C.S.I., on the subject of obstructed drainage as a cause of fever, and of a

letter from the Officiating Secretary to the Government of Bengal, directing me, if I agree with the views expressed in the pamphlet, to bring the subject to the notice of district officers, and point out to them how much can be done, at small cost, for the bettering of drainage. I have been too short a time in Bengal, and have seen too little of the country, to commit myself unreservedly to the Rajah's views; but there is sufficient *prima facie* probability about them to make it worth while to test them practically by removing obstructions to drainage wherever possible. Diminution of fever should, and in most instances would, follow to the clear gain of those living in the neighbourhood.

2. The relation of dampness to fever, and the possibility of eliminating the latter by getting rid of the former, are two of the best known facts in hygienic science, and the Rajah is no doubt quite right in assuming that increased dampness is capable of intensifying the ordinary endemic fever of the country into an epidemic. The great annual rainfall, the general flatness of the country, and the fact that rice, the staple food of the people, requires extensive natural or artificial irrigation, make any general drainage scheme practically impossible, and we can hardly hope to get rid of agues, as has been done in England; but local efforts can do much to improve local drainage and to reduce fever to a minimum. When the ordinary fever of a locality suddenly increases in severity, and it is observed that houses formerly dry have become damp, as seems to have been pretty generally the case where the epidemic fever has been met with, some obstruction to the drainage is certainly pointed to, and wherever that obstruction can be traced to new roads or dams or embankments, means should be taken to obviate the evil by providing sufficient waterway.

3. The Committee recently appointed to inquire into the great prevalence of fever at Dinaisore found conclusive evidence that the main cause of a sudden aggravation of the disease was obstruction to drainage caused by well-meant efforts to improve it. Other causes helped to increase the unhealthiness, as they no doubt do everywhere; but the evidence was irresistible that water-logging of the soil was the chief factor. The Rajah's views as to the leading features of the natural drainage of the country are I believe correct. The drainage line is, as a rule, away from the rivers, the beds of which by repeated deposits of silt are for the most part higher than the surrounding country.

4. There seems reason to believe that small local obstructions are frequently caused by landholders interfering with the drainage of villages for agricultural reasons. It would be interesting to know in how many instances these have been followed by increased fever, and whether the fever diminishes after the obstruction is removed; and I shall be greatly obliged by your reporting to me any such instances for or against the theory as may have come or may come to your notice.

5. It would be well if, in talking to the native gentlemen of your district, you would draw their attention to the subject, and point out to them the good which would probably result to their people if they did their best for the improvement of village drainage.

Abstracts of the Reports received from the Magistrates of the districts in Bengal on the subject of improving the health of towns and villages by opening out obstructed drainage, in pursuance of the orders of Government No. 1424 of the 17th April 1878.

Burdwan.—The sub-division of Raneegunge is said to be entirely free from malarious fever. The soil is laterite, and almost all the sub-division is free from swamps. No action with regard to obstructed drainage is necessary, except within the municipality.

The villages of Gulsi, Anurpore, and Maro in Bood-Bood thana, and Polasdanga in Sonamukhi thana, all in the sub-division of Bood-Bood, were found to suffer much from diseases probably owing to obstructed drainage. The obstructions were removed from Gulsi, Anurpore, and Polasdanga, and steps have been taken to do the same in Maro. The sub-divisional officer has promised to ascertain in what other villages obstructions exist, and to adopt measures for their improvement.

In the town of Culna 44,400 feet of kutcha, and 1,264 feet of pucca, drains have been constructed, and 25 new culverts provided. The water is principally drained into the Bhagirathi and the adjoining fields. The construction of more drains and culverts is under consideration. The result of these works is reported to be that there is less fever in the town than there was in the corresponding period last year. In the sub-division the attention of the punchayets has been drawn to the subject, and the drains in the villages of Poorbusthali, Rameshpore, Badagachi, and Ryegram have been improved.

In village Karukberia, in thana Kotulpore, in sub-division Jehanabad, there is a series of tanks surrounded by high ground, and when the water in them overflows, it can only escape over the adjacent fields. The few channels that run through the fields are inadequate to take off the full supply, and what little would run off is dammed off by the cultivators. It is suggested that, to have the village properly drained, a cut through the fields, about half a mile in length, is necessary. No action, it appears, has been taken to give effect to this suggestion.

In the Cutwa sub-division the natural drainage of the villages situated on the Hooghly is not towards that river, but to the opposite direction, i.e. the fields on the west. The views of Government on the subject have been explained to the influential people in some of these villages.

The natural drainage of the Cutwa and Dainhat municipalities have been more or less closed up. These were the worst places so far as the fever of the late winter is concerned. The Commissioners of these municipalities have taken steps to correct the defects.

Nothing has been done for the improvement of the drainage of the sunder sub-division. The drainage of the town of Burdwan, for the most part, is into the river Banka, and it does not appear to be obstructed in any way. Here improvements are carried on each year as funds permit.

Bankobra.—The outfall of water is good throughout the district, excepting in some parts in the east. In a tract of the country lying alongside the bank of the river Dalkessur, near Ajudhya, where it has much silted up, much obstruction has been caused to the drainage of the villages. The river bank having become higher on account of the accumulation of sand, the slope of the villages lying on either side of it is necessarily inland. The ground is low-lying and flat, and the outfall of water being impeded causes abnormal humidity in the sub-soil, which contributes to the outbreak of malarious fever. Obstructions to drainage have also been caused for the benefit of cultivation by means of embankments. The construction of the road between Bishenpore and Joyrampore has induced the belief that it had something to do with the outbreak of fever there during the past year. It was constructed two years ago and completed last year, and no malarious fever was in that neighbourhood before. Further observations on this point are being made. To improve these drainage defects is a question of large expenditure requiring a special agency.

The drainage of the Bankobra municipality is very good. The town is situated on a ridge and is provided with sufficient pucca drains.

The drainage of the large town of Bishenpore is insufficient and much obstructed in different parts. Much requires to be done in the shape of changing water-courses and constructing culverts and, in some cases, pucca drains. But the income of this municipality is very small. The Commissioners have in contemplation several improvements to secure a free passage of water from the town into the adjoining paddy-fields and thence to the khals.

The drainage is very defective in the tract surrounding the union of Jaipore. It is much obstructed on account of the main road passing through the town not having a sufficient number of culverts. This causes humidity in the sub-soil, and malarious fever breaks out almost every year for the last six or seven years. The union is poor and has funds for only its six chowkidars. From a report of the civil surgeon, it appears that the general outfall of the country is from south to north, and the villages stand at the foot of a considerable slope in a line where the first stress of a rapid and sudden drainage is felt. The surface water gathers and pours in torrents partly into the fields and partly into a tank called Hikimbund, a bheel some 55 bighas in extent and situated in the south of the village Jaipore, but chiefly into the Sunderbund a large tank on the west. The latter has a permanent outlet in order to prevent the surrounding embankments breaking from rapid overflowing and the consequent submersion of the neighbouring cultivated lands. The water being let off, the whole bund becomes a marsh in the dry season. The Hikimbund also becomes a marsh owing to the small cutting for the inlet of water not being sufficient to fill up even moderately this large bheel. The shallowness of these bunds is said to be due to irregular ingress of water, and not so much to the upheaval of their beds.

Beerhoom.—The natural formation of this district is believed to be favourable to drainage. No action was taken either in the municipality or district on receipt of the circular on the subject, but the local authorities are not aware of any serious obstruction to drainage.

Midnapore.—Inquiries on the subject were made through the sub-divisional officers, zemindars, and some Government officials, but the replies received throw no light on the matter, nor could the Magistrate by personal inspection of several parts of the district trace any clear connection between defective drainage and the prevalence of fever.

The zemindars of Jara having reported that there was not sufficient waterway in the road from Chunderkona to Ghatal, and that the construction of cross-dams at several places over the Jhooni and the Dalkessur in certain parts of the district near Ghatal for the cultivation of crops interfered with the drainage, steps were taken through the Executive Engineer to remedy the evils.

It having also been represented that it was necessary to open up the mouth of the Kotra khal, which had been blocked up during the completion of the Chetna circuit embankment, inquiries were made, and it appeared that a sluice was at one time in course of construction at the place, and that the project failed as the funds raised by the local residents proved insufficient. Since then nothing has been done in this direction, and until fresh funds are forthcoming, the matter has to remain in abeyance.

Hooghly and Serampore.—The subject was brought to the notice of the Road Cess Committee, which is largely composed of native landowners, and of the several municipalities in the districts.

At the sunder and Serampore sub-divisions a survey is being taken of the drains of Mohesh Rishra, Connaghur, and at the Hooghly municipality it has been determined to drain the Shandepurtollah ward in Chinsurah. This expensive work was commenced last year, and will, it is hoped, be completed during the current year.

Howrah.—In this district many of the smaller drainage channels are used also as lines of communication in the rains, and it is believed that it may be possible in some cases to subsidise local efforts with road cess funds.

With regard to the villages in the Doomjoor and Juggutullubpore thanas, there is no necessity for immediate action. These thanas comprise tracts, the bad drainage of which has attracted the attention of Government for many years, but the two schemes known as the Howrah district and Rajapore schemes will, when carried out, do all that is required, with regard to the improvement of the drainage of these tracts.

At the Howrah municipality the drainage channels of the Shibpore quarter were thoroughly opened; arrangements were made with the Superintendent of the Botanical Gardens, through which the main line of drainage lies, to regulate the opening and shutting of the sluice there according to the drainage levels; the principal drainage channel of the Ghoosery quarter, westwards, was opened out, and a series of obstructions removed; and elsewhere the subject has received the careful attention of the municipality. An allotment has been made in this year's budget for the purpose which, though insufficient to meet the wants of the large area over which it has to be spread, will be usefully spent.

24. Pergunnahs.—The detailed reports relating to the drainage of this district, and the suggestions to improve its defects, have been, I learn, already submitted to Government. I need not therefore enter into particulars here. It appears that it is very necessary to drain the large bheels and marshes in this district, and to protect properly the lands subject to inundation by salt and brackish water, which render successful cultivation impossible. The report relating to the Salt-Water Lakes being a great nuisance and a source of much unhealthiness, has been referred to in the general administration report of the district for 1878-79, and is, I believe, before Government.

The works of improvement of drainage near Khordah and Titaghur has been sanctioned and are about to be undertaken.

With regard to the drainage of the several municipalities in this district, the Municipal Commissioners look after it as much as the means at their disposal allow, but the funds are in most instances too small to allow of the requisite works being done.

Nuddea.—Report not yet received.

Jessore.—The Magistrate reports that no instances of fever following on obstructed drainage in the district have come to his notice. There are no large works or embankments in the district, raised either for agricultural purposes or for communications, which in any way interfere with the ordinary drainage of the country. Ryots and landholders do not as a rule obstruct drainage. They shut out the floods in some places till their *aus* paddy is gathered. The temporary embankments are then cut, and the inundation is allowed to flow freely into the bheels and over low-lying lands to irrigate the *amun* crop. As the rivers subside the bheels drain into them. Planters usually promote drainage over large areas in connection with the indigo sowings.

Moorshedabad.—Two filthy holes lying in the heart of the Berhampore municipality are to be excavated and turned into tanks of fine water by the proprietors of the land on which they are situated, and the drainage works connected with them for the discharge of surplus water are to be undertaken by the municipality. The municipality proposes to fill up another large hole and to construct drains to carry of the surplus water which now runs into this hole. Efforts are to be made to make the owners of certain other holes at Sydabad to fill up or re-excavate them.

The work of all others, which would tend most to improve Berhampore, is the filling up the sides of that portion of Bistopore bheel which runs through the town by communications with the river, by throwing up the earth obtained by deepening the channel in the centre. To carry this out, it will be necessary to buy the land. At present, however, the municipal funds will not permit of this being done.

In the Jungipore town there are a number of excavations of greater or less magnitude. It is found that it is not possible to flush them from the Bhagirathi by means of sluice-gates, as the excavations lie far above the ordinary level of the river and would only be flushed at high flood. The alternative is to fill them up gradually with earth to be obtained by excavating deep and proper tanks. The largest, called the "Jola," requires first and special attention.

Dinagepore.—The drainage scheme recommended by the late committee appointed by Government to inquire into the unhealthiness of Dinagepore is being vigorously pushed on in the municipality of Dinagepore, under which several obstructed drains are being cleared out, so that all the water may easily be drained out into the dead river Ghogra, the natural drainage channel of the municipality, which runs from east to west and leads into the river Purnabhaba. That obstructed drainage plays a most important part in the causation of fever within the towns was satisfactorily ascertained by the committee. The Vice-Chairman of the municipality is endeavouring to trace out the course of the fever, village by village, and has promised to furnish a report on the subject.

Rajshahye.—This district is very low in many places, being below the high flood-level of the Ganges, but nowhere below the bed level of that river. The drainage line runs away from the banks for a very short distance, the real drainage of the country being from the north-west to the south-east.

The members of the Road Cess Committee, the Municipal Commissioners of the town, and the principal men of the district were requested to bring to notice any obstructions caused by roads, or in any other way, to the natural drainage of the country. The Executive Engineer has also been asked to report how far the drainage has been affected by the Northern Bengal State Railway. No reports have yet been submitted.

Rungpore.—Great attention was and is being paid to the drainage scheme of the Rungpore town, whereby the water-logged tract within which the municipality is situated, and which is the worst example of obstructed drainage in the whole district, has been partially drained. The result, it is said, has been a marked improvement in the health of the people, and it is believed that, if the scheme is completed and maintained, the municipality can be made fairly and moderately healthy.

Persons causing obstructions to the river Ghogat are prosecuted and punished. A scheme for improving the river has been drawn up.

Bogra.—Beyond circulating the circular on the subject to the Commissioners of the Municipality, no special action was taken in the matter.

Purnia.—The Magistrate, who has seen a good many of the large villages and towns of this district, thinks that the district may be called healthy and one in which public health does not suffer from obstructions to drainage. What the people call for are roads and good drinking-water.

Natural obstructions to drainage exist in the silting-up of khals and the numerous streams, but the water then passes through other channels and its benefit is transferred to other spots. The water in the jheels and beels also stagnate. There are, in the part of the country west of the Foothills, a considerable number of jheels and beels. Their reclamation would probably be beneficial, but it would involve very extensive drainage works.

In the town of Shazadpore, where fever was said to have prevailed most fatally (there was, it is said, no fever in it in 1878), there are two khals—one, which is about seven miles in length and passes through the town, has silted up not only through straggling town, but from thence to its exit from the Oorasagur. To excavate this channel afresh would be a work of great expense. The other khal, which runs under the police-station of Shazadpore, not through the town, but along its border, has also silted up at its junction with Oorasagur. This obstruction can be removed at a small cost, and the District Engineer has taken the matter in hand.

The drainage on the Chandaikona road was obstructed, and a culvert was ordered to be made to relieve the obstruction.

Darjeeling.—Arrangements were made through the Road Cess Committee to have proper drains made for the two principal roads passing through the Bander, viz. the Khoribari and Matigora roads in Phansidewah in the Terai, and to have the sides of these roads cleared of all jungle. An estimate was also submitted to the Commissioner of the Division for keeping clean and opening the drainage of two important roads, viz. the Barowerparah and Hospital roads in Phansidewah station, by which means proper drainage and free ventilation would be secured, and for filling up two very bad excavations in the Phansidewah bazar which are reservoirs of all manner of filth and stench.

Julpigoree.—At Julpigoree it is specially difficult to give effect to the suggestion of removing obstructed drainage, owing to there being very few actual villages, each man, as a rule, having his bâri in an isolated position on his own jote. These bâris are erected on the highest land on the jote, but are surrounded on all sides by rice-fields, into which every effort is made to drain water and to retain it there. In addition to this stagnant water, most of these bâris have near them two or three large stagnant pools, formed by excavating earth for building purposes, which are full of all descriptions of filth and refuse, and are surrounded with bamboos and plantain and betelnut trees, which effectually stagnate the air about them.

The Deputy Commissioner suggests the compilation and distribution to the people, gratuitously and widely, of a small pamphlet showing that experience has taught that stagnant water and impeded drainage are the causes of half the fever which decimate the people, and setting forth the best remedies to be adopted to render their homes more healthy.

Dacca.—The Manickgunge sub-division is stated to be the only part of the district in which any good could be done by the removal of obstructed drainage. In this sub-division fever breaks out in the last quarter of every year on the subsidence of the flood water, and is traceable to obstructed drainage. The country is intersected by little streams, the banks of which are higher than the surrounding villages, and the consequence is that the land is water-logged and remains so for months until the sun has evaporated the moisture. The Magistrate proposes to improve the drainage of a few villages by lowering the bheel water after the present rains, that is, in October next, as an experiment to see whether it is worthwhile to extend the scheme to other parts; but as the measure will cost a few hundred rupees, he asks how this outlay is to be met. The Road Cess Committee has sent up a proposition to open up the Hilsamari. This project is objected to by the Superintending Engineer, but the Magistrate believes it would do much for the health of the district apart from its usefulness as a measure of communication.

Purreedpore.—The natural drainage of that portion of the municipality which is within a khal, which leaves the Ganges a mile from the station and passes in a semicircle to the north and west of the town, and finally passes into the Dholesumundra, a large lake to the southwest, and in which the station, bazar, &c., are situated, is, the Magistrate reports, the most perfect he has ever known in the flats of Bengal, and this drainage has in no way been interfered with artificially. There are culverts at every necessary point except at two, where it is hoped they will be supplied in due time. All accumulations of water are taken off by the simple expedient of cutting the road. The highest points in this tract are naturally the banks of the Ganges and the khal. The drainage flows away from them into the Dhole. In the rains, when the river rises, the khal fills and the water flushes all the drains in the town, which are then like running brooks taking the Ganges water into every nook and corner and filling every tank, and finally by a variety of different channels discharging themselves into the Dhole. When the khal falls the drainage still continues to flow into the Dhole; when the river falls the Dhole does for a certain time continue to discharge its waters through two or three khals into the river; and when these khals dry up the Dhole still continues to receive the surplus water, as long as there is any, with the exception of a little which finds its way by artificial channels into the khal.

Of the drainage of that portion of the municipality which lies beyond the khal which encircles the tract above referred to, much has not been ascertained. There is a branch khal which leaves the above-mentioned one near the bazar, and finally falls into the Kumar river at Kumarpore, about seven miles by road. It is believed that most of the drainage of this tract falls into this branch khal.

The drainage of the outlying villages embraced by the municipality is, it is feared, somewhat obstructed, but steps have been taken to have the obstructions removed.

The Furreedpore khal is closed by a bar at the mouth in the dry season. It is said that a considerable sum would be required to keep it open again. According to the District Engineer it is impossible to open it, because the level of the Kumar river (stagnant in the dry season) is several feet higher than that of the Ganges, and the result of opening it would simply be to draw the Kumar dry. The Magistrate, however, suggests that a scientific report on this subject be obtained from a superior officer of the Public Works Department.

The Magistrate says that the main khal which flows into the Dholesumundra cannot be opened because of the bazar bridge, the culverts of which are two feet higher than the low water level of the Ganges, whereas they ought to be four feet lower. He thinks that if this bridge was demolished, Furreedpore would be able to count on a good stream of running water throughout the year, as well as a waterway leading pretty nearly all over the district. But the building of the bridge has cost a very large sum of money and it would have to be replaced at even greater cost.

The defects of the drainage of village Kendua in Madaripore have been removed by deepening a khal, for which the villagers subscribed Rs. 500, and which amount was supplemented by a grant of Rs. 1,000 from the Road Cess Fund. This work has also improved the drainage of four other villages. The people of another village (Bazipore) are about to apply for a similar grant for the same purpose, and the drainage of village Ishibpore is to be attended to by the Sub-divisional Officer of Madaripore.

The drainage of the Madaripore municipality has been improved.

In the district generally there is no reason, it is said, to believe that the drainage has been obstructed by roads, and in the south there are practically no roads, and such roads as there are have a continuous ditch alongside communicating with the khals. With regard to all roads recently constructed, care has been taken to allow sufficient waterway.

In connection with this subject, the Magistrate reports that there is a great want of tanks, especially in the south of the district. There are no tanks within three miles of the Polong thana, and when the khals dry up, the people are put to great straits for drinking water. He also strongly urges that prison labour be allowed for carrying out public works.

Backergunge.—The Magistrate reports that in this district complaints are not heard of obstructions to drainage.

Mymensingh.—The Magistrate reports that owing to the circular on the subject having either been missent or mislaid, no action could be taken. A copy of the circular has been sent to him, and his reply, when received, will be submitted to Government.

Tipperah.—Beyond deepening or re-excavating the channels of some small khals by the Road Cess Department, no special measures have been found feasible during 1878 in the district. The drainage of the municipality was however properly attended to.

Chittagong.—Chittagong is reported to be in fact not at all a water-logged country, the drainage being natural and free from the hills to the Bay of Bengal, or to the big rivers falling into the Bay, and no artificial measures are, it is said, required to improve it. The Magistrate is decidedly of opinion that the natural drainage of the country is not obstructed to such an extent as to affect the health of the people, and he observes that although there are plenty of dams erected during the hot weather for agricultural and irrigating purposes, he is not aware that their construction has ever been accompanied by increased fever, or that their removal has ever been followed by a diminution of that disease.

Noakholly.—In the town of Sudharam fishing in drains has been put a stop to, and the drains are kept clean.

With regard to the villages in the district, the Magistrate remarks that it is not an easy matter to take any effectual measures for remedying obstructions to drainage, and that the issue of general instructions without personal instructions or reference to particular cases might do more harm than good. He adds that the district is, however, not badly drained on the whole, and, considering its locality and natural dampness, fevers cannot be said to be abnormally numerous or severe.

Patna.—In the Patna Municipality a very important drain has been completed which serves to carry off rain or flood-water to the julla to the south of the city.

A much more important and faster scheme for the effective drainage of the civil station, by the excavation of a channel towards the julla to the south, has been some time under consideration, but it could not be carried out owing to the necessity of obtaining professional inquiry and advice, and for want of funds.

A canal for Bankipore, by which rain-water can be discharged in the direction of the river when low, has been taken in hand, which is considered a boon to the station till the river rises.

No action has been taken with regard to the villages in the district, but the attention of the Sub-divisional Officers and of the Road Cess Committee has been drawn to the subject. Their reports are awaited, and it is intended that the cost of the minor works that may be recommended will be met from the Road Cess Fund, and that larger works will be undertaken under the Embankment Act.

Gya.—In this district there are no jheels or obstructions to drainage; the rainfall is not so heavy as in Bengal; and the outfall of the drainage is an uniform gradual incline from south to north. Hence the suggestions of the Rajah are not applicable to this district. This surplus water is stored in embanked reservoirs, sometimes of considerable magnitude, and constructed at considerable expense for the purpose of irrigation.

The drainage of the municipalities and unions has been much improved, and all that is considered necessary in this direction is done with due regard to the finances and other important demands upon the funds.

Shahabad.—The railway lines and canal works in this district are stated not to obstruct drainage materially. With regard to the former, it is proposed to increase the waterway towards Kollwar, where it is deficient at present; and with regard to the latter, it is suspected that although sufficient provision has been made for waterway in the main and branch lines and chief distributaries, the sub-distributaries do to some extent impede drainage, and there is not sufficient means for carrying off the surplus water from the flooded fields in all cases.

It is suspected that the embanked roads in the district are not supplied, owing to limited local funds, with sufficient number of bridges, or are supplied with just that number which the Engineer considers safe, and that therefore, although the amount of waterway may be enough to secure a road against all ordinary floods, it may not be enough to keep the embankments from acting as drains and swamping the whole country above them. The Magistrate has, however, impressed this view of the matter strongly on the District Engineer, and is endeavouring to establish the principle that no embanked roads should be constructed without sufficient waterway to carry off the rainfall rapidly.

It is believed that the greatest obstruction to the free drainage of this district is caused by the *aharas* and bunds.

An extensive system of drainage is being carried on in Sasseram town.

The town of Arrah is well situated, and the Gangni nuddi ought to carry off all the drainage; but internal drains are much wanted, which, it is hoped, the municipality will be able to construct by degrees. There are also many holes and depressions all about the town which will have to be dealt with when funds permit.

It is believed that the drainage of Buxar is insufficient, although the town is situated on the banks of the Ganges, and there should be little difficulty in draining it. The question has been brought to the notice of the Municipal Commissioners.

The Superintending Engineer believes that the construction of the Bhojapore and Doomraon distributaries, by causing the Kao stream to revert to a channel from which it has been diverted, will cause some danger of floods to a part of Doomraon. The course taken by the stream during the last rains was watched, but the result has not been reported to me.

The worst drained place is the great village of Nasirgunge, but an extensive system of drainage, calculated to remedy all present defects, has been started. This drainage scheme is to be extended to the adjacent village of Harihargunge.

Wherever possible the tanks are being filled up with water from the canal with excellent results. This has already been done at Arrah, Doomraon, and Nasirgunge. In places where this advantage cannot be availed of, the water-supply must in the main be obtained from wells. A plan has also been sanctioned by Government for the thorough renovation of the magnificent tank of Shere Shah at Sasseram.

Mozafferpore.—It is said that neither the roads nor the railway obstruct the drainage of this district. I beg to forward herewith extracts from the letters of the Magistrate and the District Engineer, which furnish an interesting account of the subject, and which also show the cause to which the fever that prevails in this district may be referred.

Durbhunga.—No instances have come to the notice of the Magistrate in which it appeared that in the mofussil danger to the health of the inhabitants was attributable to obstructed drainage.

In the town of Durbhunga much attention has been bestowed by the Municipal Commissioners to drainage. Here the tanks, which are very numerous, while they collect all the surface drainage and so prevent the accumulation of excessive subsoil moisture during the rainy season and cold weather, are likely to become causes of fever and bowel-complaints if their supply of water were allowed to fall short and become impure. To remedy this evil it became necessary to completely flush all the tanks with pure river water once a year. For this purpose a channel of the uniform breadth of ten feet to the Kamla river, which is the chief source of supply of water to the tanks, has been cut, and the connections between tank and tank have been improved. The result is that the water, which in past years would have remained for days on the lowlands north of the town, finding its way slowly into the tanks, now flows in a considerable stream into the tanks and fills them in two or three days. Three subsidiary channels from the Bagmati river flush the few remaining tanks not reached by the Kamla overflow. The Commissioners have also cleansed and, where necessary, deepened and repaired the many minor channels which drain the surface of the town.

Sarun.—The sanitary condition of this district with regard to fever is said to be very different from that of the districts in Lower Bengal. The only tract in which fever can be said to have anything like a permanent abode is a narrow strip, from a mile to two miles in breadth, along the banks of the Jhuri river at the north-west of the district, and in this locality villages are generally conspicuous by their absence. It is believed that this fever is induced by the rank vegetation and jungle in and around the channel, as in the lower part of its course, where there is more water and less jungle, the same degree of unhealthiness is not observed.

The natural drainage of the district is well looked after by the Road Cess Committee. Large numbers of bridges and culverts have been constructed, and steps have been taken to provide more, and it is said that there is probably no district in Bengal which can show better roads, with more open waterways proportioned to drainage requirements, than Sarun.

There are numerous artificial drains made by the zemindars and others not always in perfect order; but, as they stand, they carry off large quantities of water which, without them, would be stagnant for several months after the rains. These drains have been constructed for agricultural purposes, and consequently in the present dearth, self-interest will be a strong stimulus to the owners to improve them.

The drainage of the municipalities in this district is unsatisfactory. At Chupra the main, but not the back, streets are well drained. At Revilunge pukka drains have been and are being constructed along the main streets, and it is under contemplation to introduce a system of drainage-pipes which will carry off tolerably into the Gogra river much of the water which now stagnates in the rains. At Sewan the drainage is decidedly defective. The Magistrate says he never saw a municipality in which there was less artificial drainage. It is proposed to have the drains cleared and to make them pukka in the more important parts of the town.

Chumparun.—No steps were taken for draining the villages in the district, but holes and depressions in the town of Motihari are being filled up, and endeavours are being made to perfect its system of drainage. But the Magistrate, Mr. Weekes, writes that his views with

* No. 91D, dated 8th July 1879.
regard to the Hooghly and Burdwan fever are widely different from those of the Rajah. I beg to submit a copy of his letter* on the subject.

Maldah.—The drainage of the two municipalities of English Bazar and Old Maldah is said to have been carefully looked to, obstructions have been removed, and proper fall and communication with suitable outlets maintained.

In all the villages through which district roads pass repairs are effected in such a way as to facilitate drainage as far as practicable; but no special steps appear to have been taken for the improvement of village drainage beyond calling the attention of the local residents to the subject from time to time.

Monghyr.—South Monghyr being a hilly country its natural drainage is into the Ganges by a number of channels which assume the form of torrents when the rain falls, and which dry up when it ceases. Obviously no silting-up of these channels takes place, and temporary obstructions, such as small dams for irrigation purposes, go at the very first shower.

On the other side, the bank of the Ganges being higher than the country inside it, throws back the rainfall into several jheels which, however, as they fill, connect themselves with the Boorgunduck and Tiljooja and their branches, by which the superfluous water runs off till the jheels resume their normal level. No obstructions to natural drainage are known to the Magistrate, who adds that malarious fever is nowhere prevalent in the district.

Bhagulpore.—No obstructed drainage in this district.

Purneah.—The drains in the municipalities of Purneah and Kishengunge have been kept in excellent order, and obstructions to drainage removed. The Rajah's memorandum was circulated to all the principal zemindars; the police were directed to report all obstructions to drainage; notices were issued to all owners of public wells along the Ganges and Darjeeling road to repair and clear them; and no opportunity was lost to point out to the people that bad water and obstructed drainage are the most fertile sources of disease. The Magistrate says that, unless the people help themselves, much cannot be done by Government officers in this direction; that a dung-heap or festering cesspool in the immediate vicinity of a house is looked upon by the people as a convenience rather than a nuisance, as the one supplies fuel and valuable manure, and the other water for domestic purposes; and that although these are public nuisances, it is difficult to prove them to be so, seeing that all the people living around them see no offence in them. This difficulty, it is said, can only be wrestled with by a legislative enactment as the local officers can do little to meet it.

Sonthal Pergunnahs.—Here, where it is not mountainous, it is hilly or at least ridgy or rolling. So far from the river banks forming the basin lips they are invariably the points of greatest depression. There is only one jheel in the whole district, obstructed drainage is believed therefore to be impossible.

Cuttack.—With regard to this district, I cannot do better than submit a copy of the carefully-drawn up report of Mr. Beeson, the Magistrate, on the subject.

Pooree.—The Joint-Magistrate of Khoordah reports that the sub-division is well drained by the rivers falling into Chilka Lakes, but the Magistrate does not agree with him, and is of opinion that the Ganjam-road has not sufficient waterway even for agricultural purposes. It appears to him strange that the Public Works Department, in circular No. 143M, dated 31st May 1878, should state that the subject had their attention for many years, and that care had been taken to limit the power of District Committees, lest natural drainage should be interfered with, as he thinks that the large embankment works carried on by that department must have affected the natural drainage much more than local works.

In the town of Pooree much improvement has been effected by the construction of an outfall drain which carries off surface water into a natural channel leading to the sea.

Balasore.—Here the attention of the principal native gentlemen of the district was drawn to the subject. Abstracts of such of their replies as have been received are subjoined.

Koilas Chundra Rai Mohasoy, Honorary Magistrate and zemindar of Dehurda, in thana Baliapal, reports that he instructed the village headman, leading ryots, and surbarakars of his

z-mindari to look after the drainage of their respective villages, intimating to them that water-logging caused by imperfect drainage is the main cause of malarious fever, and promising by way of encouragement to supply them with the requisite funds and land for opening out new waterways where necessary. In some large villages, such as Deburda, Modhupura, &c., roads have been constructed, and most of the waterways by the sides of those roads have been opened and repaired. There are a few villages and fields in his zemindari to drain which it is necessary to dig khalls through the zemindaris of other zemindars. Endeavours are being made to obtain the aid of these zemindars in the matter.

Rai Nimai Churn Bose, Bahadur, Honorary Magistrate and zemindar of Byang, in thana Dhamnagar, reports that although there was an outbreak of malarious fever in some parts of his zemindari, and although the people are yet suffering from its consequences, it does not appear to him that the fever is due to any obstruction to drainage of the nature referred to by the late Rajah Degumber Mitter. The fever, he says, is probably due to want of high floods.

Baboo Umesh Chunder Mundal, zemindar of Mobarukpore, in thana Soro, and Krishnapura, in thana Basudebpore, says that his zemindari has not been visited by the type of malarial fever prevalent in Bengal, and that consequently there has been scarcely any opportunity to test the theory of the Rajah on the subject. He adds that in none of the villages of his zemindaris has the natural drainage been obstructed by the construction of canals or roads, except in Mobarukpore through which the Juggernath-road passes, but that it has not been noticed that malarial fever has prevailed in the villages along this road.

Munshi Abdul Subhan Khan, Government pleader and zemindar of Gurpada, in thana Busta, intimates that the drainage of no part of his zemindari is obstructed, and that none of the villages are fever-stricken.

The Magistrate adds that generally it may be said that the obstruction to drainage so common in Bengal exists but little in this district, where much of the ground is high and has a good natural slope. Where such obstructions exist the zemindars profess themselves willing to do all in their power to remove them.

Hazaribagh.—In this district the slopes are so great and the soil so friable that the principal difficulty is to prevent natural drainage doing mischief, as directly any quantity of water begins to run, a scour immediately takes place, and a small water-course becomes, unless carefully watched and guarded by cross embankments, a deep ravine. While in Lower Bengal the difficulty is to get rid of the surplus water, here the difficulty is to retain every drop of it, as the people are never blessed with a surplus of that element.

Lohardugga.—Here the country being of an undulating character the drainage is excellent and no water-logging of the soil can ever occur. It is believed that the fever, which is very prevalent and fatal in this district, is not caused by obstructed drainage; vast tracts of the district are forest-covered, consequently the quantity of decayed vegetable matter must be very considerable, and the action of the strong sun on it no doubt generates miasma, and this must be one cause of the fevers prevailing in the district. The district is also subject to very sudden and extraordinary variations of temperature, and as the mass of the people are not over-well clad, these sudden changes cause chills and induce fevers.

Singbham.—The observations relating to obstructed drainage are not applicable to this district, as the nature of the country is undulating and the natural drainage is excellent. All rain water is rapidly drained off, and there is not, and cannot be, any water-logging, and the villages themselves are situated on knolls and eminences.

Maubham.—No difficulty is felt in this district with regard to obstructed drainage; the difficulty lies the other way. It is always the object of the agriculturists to save the water which too readily flows to a lower level. The physical conformation of the district secures for the people a remarkable immunity from fevers.

J. M. COATES, M.D.,

Sanitary Commissioner for Bengal.

The 23rd September 1879.

No. 91D, dated Motihari, the 8th July 1879.

From—A. WEEKES, Esq., Magistrate of Chumparun,
To—The Sanitary Commissioner for Bengal.

In reply to your No. 454S, dated the 25th ultimo, I have the honor to inform you that nothing has been done to improve the health of villages by draining of water, but that what, from my point of view (which is perhaps peculiar), is much more important, an attempt has been made to let the river Sikrana water into the two Motihari lakes by cutting a canal as you are aware. This was not deep enough, and the levels, I find, were wrong. I am having the matter remedied.

As regards Rajah Digumber Mitter's memorandum, I have the honor to represent that my views of the origin of the Burdwan and Hooghly fever are widely different from his, except in the point which is that fever is more rife on the higher and drier grounds on which the houses are built in Bengal than in the swamps themselves. But it is all nonsense to say that fevers are caused by the dampness of the comparatively small patches of homestead lands and not by the existence of the interminable areas of disgusting and stagnant paddy-fields and swamps. Drain these latter, and therewith the whole country, which consists of nothing else and grow better nourishing crops of a higher order than rice, and the country will in time alter its nature and become healthy. You cannot cherish stagnant paddy-swamps and expect the little oasis of village lands, only a little higher, to be healthy.

My own opinion of the origin of the fever (and I have served both in Burdwan and Hooghly) is that it is due to insufficient, or rather less than usual, rainfall, supplemented by the effect of embanking the river Damooder on the left bank. This had the effect of drying up the whole country side from the Damooder to the Hooghly. There is a fall of 80 feet between the Damooder and Hooghly, and this slope represents the Hooghly district. Formerly the Damooder used to flood the whole of this, and actually used to reach the town of Hooghly on the river Hooghly when it flooded the streets, so that people had to go about in boats. The effect of deficient rainfall and of the embankment combined was so great that in 1875 I saw the whole district utterly dry—a most unusual thing. People were drinking water from mud-holes in the river Saraswati, until the Damooder water was led into the stream in the summer of that year to the great relief of the people. What I say is this, that the extreme dryness of 1873-74 and the preceding year, and of 1874-75, dried up a country that had *never been dry before*, and allowed gases that had been imprisoned deep down and had never before been able to reach the surface, to be given off into the atmosphere, and still worse, the drying up of the country, which in other years did not begin till the cold weather had set in, or even till January and February, commenced and was in active operation *in September and October, when the heat of the sun was sufficient to render the gases pestilential and to develop all kinds of germs.*

Paddy-swamps and swamps too deep for cultivation (as was the Dankuni jheel before it was drained), though always injurious to health, are not pestilential except when they are drying up, and it was the general and unusual dryness on the whole surface of the country that made the air fever-giving and the water too. I know the country near Serampore and Mohesh wants draining, and that our efforts have been frustrated by certain obstructive persons, but it is of no use draining the homesteads if the whole country is to remain a paddy-swamp and the inhabitants are to cover their houses with the rankest vegetation possible, as they do at present, shutting out the sun entirely. "Where the sun never comes, the doctor will." There must be a line somewhere between the homestead and the swamps where the land will be always drying up and exhaling fever-producing gases, and the most filthy customs of the inhabitants have much to do with the intensifying of bad influence. It is my belief that excrement and other human secretions enter into the composition of all their drinking-water. It certainly does into that of the water with which they rinse their mouths. Then, again, they always have a deposit of decaying vegetable matter close to their houses. Drainage is good in its way, but not to be depended upon as a panacea. Good drinking-water is quite as important to say the least of it. This might easily be done in the Hooghly and Burdwan districts by damming up the river Damooder every year in November and December, and leading it into the Kana Damooder and the Saraswati. The people will not pay for it. It is tiresome to collect the cost. It should be paid from the Public Works Cess.

Another important point is to get rid, if possible, of the mistaken and injurious notion propagated, I believe, by Mahomed, and adopted by the Hindus, that if a certain proportion of water be added to any kind of filth—excrement, decayed corpses, or the most noxious filth conceivable—it is perfectly harmless and may be drunk without harm, i.e. *without loss of caste*; for the very idea of injury to health by such contamination is wanting in their minds. The only idea present is about contamination of caste, which, being a troublesome matter, they are glad to set at rest by a comfortable doctrine such as the above.

As regards Ramnuggur and the north part of this district and the question of improving the health of its inhabitants by drainage, I am of opinion that the fever there is not due to want of drainage, but to the sub-Himalayan situation of this tract, and that fever must always exist in such terai lands.

I have been attending to the drainage of Motihari lately and filling up holes and depressions where water used to lodge, and am trying to perfect the system of drainage which is at present defective.

No. 945, dated Cuttack, the 17th August 1878.

From—H. S. BEADON, Esq., Magistrate of Cuttack,
To—The Sanitary Commissioner for Bengal.

I HAVE the honor, in reply to your circular No. 45, dated 15th May 1878, to give you an abstract of the replies I have received from most of the officers who move freely in the interior of the district.

Jajpore.—Joint-Magistrate reports that he has noticed no special cases, and that malarial fever is of extremely rare occurrence. Jajpore is a town thoroughly water logged and without drainage, and yet it is considered by the inhabitants to be one of the healthiest towns in Orissa.

Kendrapara.—Deputy Magistrate says that last year fever prevailed along the Gobri canal, a new canal which he thinks crosses the drainage of the country. He will watch the results of this year. In the meantime the attention of the engineer officers will be drawn to the alleged necessity that further siphon waterway under the canal should be given.

Deputy Superintendent of Canal Revenue reports that no actual cases of sickness have ever come to his notice, but as "in many places along Government canals and distributaries the percolation water between the banks and village sites is calculated to engender the evils referred to, in justice to the people affected a system of tap drains alongside all Government channels should be made to relieve all such villages of the additional moisture that such accumulations must cause."

If Government should think fit to act on this suggestion, it will have to be referred to the Irrigation Department; but as no sickness has been noticed yet, Government may perhaps shrink from incurring the expense, which I fear would be large.

The District Superintendent of Police, who naturally sees more of the area of the district than any other officer, and who with the Magistrate has daily reports from 45 stations throughout the district, has noticed no outbreak of sickness in connection with impeded drainage.

The District Engineer reports that in no part of the district do the roads cross the drainage, except the Chandballi road in parts, and as regards this, I can relieve Government of all anxiety as to the road impeding the drainage, for every year the road complacently yields to the flood and to a large extent disappears. The District Engineer, however, mentions that villagers in several places obstruct the drainage for fishing and domestic purposes; but as all villages are built on high ground, the high banks of rivers existing, or which formerly existed, no special sickness is caused.

No special sickness from impeded drainage has come to the notice of any of the inspecting Educational officers.

2. Act VI (B. C.) of 1873 does not apply to Orissa, so special action under that Act could not be taken even if the occasion existed. Orissa is noted year after year for its special freedom from fever in comparison with other great geographical divisions of Bengal, and this is the case though large portions of the district are flooded each year, and much of the water impounded when the flood falls cannot escape, but lies over the country in large marshes to be gradually absorbed and evaporated during the cold season and earlier months of the hot weather.

3. As a whole, however, the district is well drained. It slopes from the hills on the west to the sea on the east, and until the streams are under tidal influence, the subsoil drainage seems to be sufficient for nature's purposes, in spite of the fact noted in paragraph 3 of your letter, that the beds of deltaic rivers are often higher than the surrounding country. Near the sea coast there is undoubtedly much fever of the true malarial type, owing to the diurnal flooding and drying of the land in the innumerable creeks and depressions which are subject to tidal inundation.

4. But I am confident that the obstruction to drainage by the people themselves must have an infinitesimal effect upon their health. Inquiry seems to be travelling again over the old ground. Eight years ago it was shown, and I thought accepted as a fact, that high and well-drained villages in Bengal suffered equally with those that were low and water-logged, and in which every sanitary precaution was neglected. When the fever, known as the Burdwan fever, after a long check on the left bank of the Damodar, broke out on the laterite country in West Burdwan, it was shown that nothing to alter the drainage conditions of the locality had occurred.

5. While the question of draining the whole of Bengal into the Bay cannot be dealt with, I fear little good as regards malarious fever will result from the removal of small local obstructions; but all officers have been urged to bear in mind the instructions contained in paragraph 5 of your letter, and I will myself not fail to urge upon the people the advisability of carrying out village drainage where necessary.

Extract from a letter, No. 380, dated the 18th March 1879, from C. F. WORSLEY, Esq., Magistrate of Mozufferpore, to the Commissioner of the Patna Division.

I QUITE agree with the District Engineer that "in this district the drainage appears to require very little attention," and that "neither the roads nor the railroads obstruct the drainage of the country." The Civil Surgeon also, while admitting that his "acquaintance with the interior of this district is far too limited to enable him to judge as to how far the health of the people is affected by supersaturation of the subsoil caused by obstructions to the drainage of the villages, either natural or artificial," does not countenance the theory that the form of fever prevailing in these parts is due to defective drainage. He remarks—"The water-logged condition of the soil which, according to Rajah Degumber Mitter, is the *sors et origo* of the epidemic malarial fever of Lower Bengal, I have not yet observed in the town or its neighbourhood, nor does the type of fever which is supposed to depend entirely on such conditions exist. The fever seen here is a seasonal complaint, commencing towards the close of the rainy season and dying away as the cold weather advances. The disease is for the most part amenable to treatment and not attended with heavy mortality. The cold season is healthy comparatively here. In Lower Bengal many years experience has convinced me it is just the reverse. The advent of the cold season invariably gives an impetus to the epidemic fever, and it is during that season that mortality and suffering from it are at their worst."

The fact that during the present year 1878-79, in which the rainfall has been deficient and the water in wells has been generally very low, fever has prevailed in this district to a greater extent than in any previous year, is a further argument in support of our views.

It is a common thing with natives to speak of the water of certain wells as likely to cause colds, and speaking empirically, I may express my belief that cholera, fever, and bowel-complaints, to which so many natives fall victims, while Europeans, who carefully select and filter the water which they use for drinking, enjoy comparative immunity from these diseases, are mainly produced by bad drinking-water.

Extract from a letter No. 589, dated 28th February 1879, from the District Engineer, Mozufferpore, to the Chairman of the District Road Committee, Mozufferpore.

It is well known that during the past year very unusual mortality has occurred in this district from the prevalence of fever, which has, in fact, usurped the place usually occupied by cholera in our mortuary returns. The cause is not, I submit, to be looked for however in defective drainage, nor in dampness of the subsoil in this district, as for some years past the defective rainfall has caused the water-level of the country to be much lower than its normal condition, and that this is the case everywhere, the drying up of old pukka wells, and the small supply of water available in others, is abundant proof, and to this may be attributed the increase of fever and mortality consequent on it. The supply of drinking-water generally throughout the district is bad, save on the banks and in the neighbourhood of the Bagmutti, Little Gunduck, and Gunduck rivers, and in such few villages as possess really good, deep, pukka wells; and as you, with your perfect knowledge of this district, are well aware, such wells are very few and far between, the villagers therefore have to resort to the nearest pool or tank for their drinking-water, which is more often than not quite stagnant, full of vegetable matter, and impregnated with buffalo and cow-dung and filth of every description. Indeed, in this district the natives appear to consider the banks of the village tank to be their urinary, and the fitting and proper place to convert into their night-soil repository, and of course the first rain washes the same into the tanks. During the past 22 months I have driven 9,305 miles in this district, and more than two-thirds of that distance in your company, and I may with confidence assert that in this district neither the roads nor the railroad obstruct the drainage of the country, nor do the Gunduck and Toorkee embankments. The natural fall of the country is away from them—that is, it tends to the south and east. The District Committee has devoted much attention and expenditure to the subject of drainage, and during the past two years has constructed 125 pukka masonry culverts and bridges, principally in the place of old temporary structures of tal-tree and bamboo, and has under construction ninety. The District Committee has also purchased a large number of glazed pottery pipes, varying from 12-inch to 20-inch diameter, from the Raneeunge Works, belonging to Messrs. Burn & Co., and these are available whenever it would appear that in any place or on any road either the drainage would be benefited by laying them down or they were required for irrigation purposes.

1,170 miles of road are now under the charge of the District Committee, and the whole of that length of road is intended by the Committee to be practicable not only by horse and cart traffic, but also for ordinary use by dog-carts or other light-wheeled traffic. To succeed in this it is obvious that the drainage must be attended to, unless high-banded roads were constructed, and such is not the case in this district.

As a fact, then, directly in any place, any where, on any road, it would appear that the drainage of the country could be improved, a rough bamboo or tal-tree structure is at once built, and this is kept up until such time as a pukka culvert can be substituted for it.

Apart, however, from the roads under our District Committee, there are a large number of petty roads in villages generally only a few hundred yards or so in length, leading to the houses of petty maliks or well-to-do ryots, and these roads invariably are thrown up without the slightest attempt to provide for drainage, and I do not hesitate to pronounce them in a great many instances very mischievous in their effect on the drainage of the villages in which they are situated.

I would here also point out that the village huts in this district are usually made of mud, and always in the rear or immediate neighbourhood of the house will be found the excavation whence the mud has been taken to make the walls. When there is no village tank conveniently near, this excavation becomes the privy during the dry season for the villagers who live in its vicinity, and in the rains it becomes filled with water, and from it percolates into the wells close by for the supply of drinking-water, laden with sewage. It is a difficult question how to deal with this last evil, as it exists in the large towns in the district quite as much as in the villages and tolas where there is no conservancy authority, and no conservancy regulations are in force.

It is a noticeable fact that the old bheels, jheels, bogs, or churs in this district are now gradually, but very rapidly, disappearing: places that as recently as four or five years ago were never known to be dry, and where the best of duck and snipe-shooting was obtainable throughout the cold and dry season, are now quite dry and cultivated with *rubbee* crops. The villagers and others with whom I have conversed on the subject attribute it to the scanty rainfall of late years, and also to the fact that the Gunduck, Bagmutti, and Ganges spill-floods are kept out by the embankments, and also to the fact that the head of the Byah river, which communicated with the Gunduck, has silted up, and that the supply of water is thus cut off. That they are right in all their reasons I know from 15 years' personal experience. The Byah river is now dry in the cold season, and in the rains no longer navigable for large boats as it used to be eight or ten years ago.

In conclusion, I would remark that in this district the drainage appears to require very little attention, but that the question of a supply of good drinking-water is becoming daily of greater urgency.

No. 744, dated Calcutta, the 31st March 1879.

From—J. WHITFIELD, Esq., Executive Engineer, Northern Drainage and Embankment Division,

To—The Magistrate of 24-Pergunnahs District.

REFERRING to your office No. 54M, dated the 13th September 1878, and subsequent reminders, I have the honor to forward a report on the condition of the 24-Pergunnahs district as regards defective drainage, and an outline of the works necessary to remedy it.

2. Should it be decided to adopt the measures suggested for improving the condition of the localities referred to by carrying out any of the proposed works, or any modification of them, early intimation is requested in order that sufficient time be allowed for preparing the detailed designs, estimates, &c., that will be required.

3. Recommendations and suggestions have been made for dealing with the large area of 260 miles surrounding Mugrah Hât, and for the reclamation of Bulli, Dantbhanga, and Boyra bheels; but after long correspondence the questions have been dropped without anything being done. I trust, in the present case, something more tangible than reports and unsubstantial correspondence will be the result.

Report on the Drainage beyond Municipal limits of the 24-Pergunnahs District.

THE Collector of 24-Pergunnahs district, in his No. 311G, dated the 8th September 1878, in forwarding a copy of the Presidency Commissioner's letter of the 16th August, asks for a report on the causes of obstructed drainage in the district outside municipal limits.

It would not be much exaggeration to say that the whole of the drainage south of Calcutta and west of the Peali river is obstructed. This part of the district is protected from tidal and river inundation by embankments, but no provision was originally made for drainage, and only in a few places have sluices been subsequently constructed, so that practically, with two or three exceptions, this embanked or protected portion may be said to be entirely without drainage. Where not embanked, the condition is still worse. The low ground being for the most part below high tide level, the salt water overflows or finds its way up the open khalls and lodges on the land, or if there be a large channel giving ready ingress and egress to the tide, then the whole of the low land becomes a tidal marsh. These tidal khalls frequently become choked at the head, and the outflow from the low grounds into the rivers, when the latter have subsided after the rains, is prevented, and the result is the formation of permanent bheels, of which there are a great number in the district.

2. The formation of the country presents a wide expanse of low land ranging from five to nine feet above mean sea level, interspersed with irregular patches of higher ground rising from 9 to 15 feet. This higher ground is occupied as village sites, some of which are barely above the surface level of the surrounding water which accumulates on the lower ground. A great number of them are below the high-water level of the Hooghly during the rains at

spring tides. High-water spring tides vary from 9 to 16 feet during the year. Low-water varies from 2 feet below mean sea level to 3 feet above mean sea level. The general height of the ground along the edge of the Hooghly is from 12 to 15 feet; in the southern part, from Fultah to Rungafullah, it is not quite so high.

2. From the edge of the river the ground falls towards the interior, the river edge being from 3 to 12 feet higher than the fields a few miles inwards, so that the drainage sluices formerly constructed being generally very near the surface of the ground are of no use for draining those portions which most require it. In many places, for 20 miles at a stretch along the embankments, there is not even a pretence at any kind of drainage beyond making cuts in the embankment, which not unfrequently do more harm than good.

4. For the ordinary drainage of the land protected by embankment, sluices of sufficient capacity are required to be constructed at the mouths of the khalls communicating with the low ground, these sluices to be at such a level as will command sufficient fall from the lowest ground they are intended to drain to the outlet, so that, when the water is no longer required for the rice crops, it could be at once drained off. A proposal was made in 1875-76 to construct 12 of such sluices on the Hooghly embankment between Akra and Rungafullah, and designs prepared. The estimated cost of those sluices was Rs. 7,448, exclusive of charges for tools and plant and establishment. These added would make a total of Rs. 9,543 each, and for twelve of such, Rs. 1,14,516.

The proposal was sent up for sanction in the beginning of 1876, and although approved, the estimate was returned with the intimation that at that time there were no funds available for that purpose, and therefore should be held in abeyance.

The following is a list of the places where the sluices were proposed:—

Locality.		Mileage on embankment.
1. Atchapeore	khall	... 13
2. Roypore	do.	... 15½
3. Nuldari	do.	... 19
4. Rajaramporekatta	do.	... 23½
5. Fultah	do.	... 28
6. Neelah	do.	... 35
7. Kholakhali	do.	... 48
8. Raghooonathpore	do.	... 53½ (This may not be necessary.)
9. Hoora or Doorbeeria	do.	... 63
10. Culpee	do.	... 70
11. Serampore	do.	... 92
12. Satpookur	do.	... 112½

5. The foregoing refers to the general drainage of the ordinary low ground protected by the embankments and within direct drainage distance thereof. There are, however, a great number of places which, from the nature and character of the locality, as well as the surrounding conditions, require special works. Of these the permanent jheels, situated in various parts of the district, are the most prominent, and whether viewed from a sanitary or economical point, possess an equal importance. Their drainage would remove an undoubted source of fever and predisposing cause of sickness from the people living in their neighbourhood, who are debilitated and in a chronic state of disease from the malarious exhalations to which they are continuously exposed. If drained, not only will the health of their localities be improved, but a not inconsiderable quantity of land be added to the food-producing area of the district.

Then, besides these permanent jheels, there is, in the central part of that portion of the district around which public embankments are constructed, a large area little better than a permanent jheel, comprising a tract of country extending over an area of about 260 square miles, having Bankipore or Mugrah Hât as its centre. Into this area the tide flows from Diamond Harbour up the Diamond Harbour creek and Oosti khall from Tolly's Nullah up the Kowrapookur khall, and from Budge-Budge up the Churrial khall. In the dry weather the tides overspread the low land with salt or brackish water, and the rains inundate and destroy the crops.

6. From want of drainage and protection, the productiveness of this locality is only a fraction of what it should be, and the inhabitants, although they may be supposed to be inured to their semi-amphibious condition by a long course of preparation resulting in the survival of the fittest, are affected similarly to those living in the vicinity of the permanent jheels. Fever is constantly present in every village, and other classes of sickness find a congenial home in the damp, unwholesome atmosphere prevailing in this extensive locality.

7. At some former period there has been some attempt at imperfect drainage combined with water communications by partially clearing and utilizing the khalls in the locality. There are a large number of khalls converging upon, or radiating from, Mugrah Hât or Bankipore as a central place. It may be here mentioned that Mugrah Hât is one of the principal places of trade in local produce in this part of the district. A "hât" is held twice a week, on Sunday and Thursday. On these days the khalls and every piece of water at or leading to the place are swarming and crowded with every description of craft capable of floating, laden with the produce of the surrounding country, where, for the most part, it is sold to dealers, who take it on by the Kowrapookur khall to Chetla Hât in Tolly's Nullah, and then it is transferred to the Calcutta mahajans.

Possibly communication was more the object of these old khalls than drainage, inasmuch as there are no roads of any kind, and for drainage—open as they are to the ingress of the tide—they must always have been very defective. They are now all nearly silted up and become useless for drainage, and nearly so, excepting in the rains, for navigation, especially in their upper portions.

The khalls which run through this central undrained area of 260 square miles are Kowrapookur khall, running northwards from Mugra Hât to Calcutta; the Churrial khall, running westward (it branches out of the Kowrapookur khall) to Budge-Budge; Oosti khall runs westward from Mugrah Hât to Diamond Harbour creek; Dongatcha khall runs south-eastward to Joynugger (out of this other khalls branch eastward); and Naraintollah khall which runs north-eastward to Soorjipore.

8. These khalls are the drainage arteries of an area, as above stated, of about 260 square miles, or would be, if deepened and widened to the capacity required for carrying off the surplus rainfall, provided the tidal water be excluded. They would also form a cheap and easy means of communication, adapted to the habits of the people, where their only means of travelling and transport of produce, &c., during two-thirds of the year is by water. Every one possesses a boat, canoe, or dongah, in which they convey themselves, their possessions, and belongings. There being few roads, transport and communication, except across the fields on foot, are stopped the remaining third of the year.

9. The space enclosed within the blue shaded color on the accompanying maps shows the area above referred to, and the strong blue lines show the khalls, which, if deepened and

widened where necessary, would completely provide for its drainage; but in addition to clearing those channels, it will be necessary to construct at their outlet sluices with gates to keep out the tides, otherwise the low ground would be more inundated than it is at present from the facilities which the clearing and deepening of the khalls would give to the inflow of the tide.

No. 634 of 4th March 1874, from Executive Engineer, Northern Drainage and Embankment Division, to Collector of 24-Pergunnahs.

No. 2319 of 26th August 1874, from Executive Engineer, Northern Drainage and Embankment Division, to Collector of 24-Pergunnahs.

No. 16 of 5th January 1875, from Executive Engineer, Northern Drainage and Embankment Division, to Collector of 24-Pergunnahs.

No. 2081 of 18th August 1875, from Executive Engineer, Northern Drainage and Embankment Division, to Collector of 24-Pergunnahs.

No. 520 of 18th March 1876, from Executive Engineer, Northern Drainage and Embankment Division, to Collector of 24-Pergunnahs.

11. Since the date of the abovementioned correspondence, detailed surveys and levels have been made of most of the khalls that permeate the drainage basin, and all the data obtained for preparing the working, drawings, and estimating the cost with more accuracy than the approximation previously given affords.

12. The character of the works will be substantially the same as those enumerated in the report of 18th August 1875, with the addition of an outlet sluice at Culpee, and opening out the khall from that place to Mugrah Hât; also, instead of constructing the lock and outlet sluice at the head of Diamond Harbour creek, I would make them at the mouth. However, this would not materially increase the first cost, and would be an ultimate saving, as it is found that tidal creeks and khalls, when closed at a few miles from their mouths, rapidly silt up and require clearing every five or six years. As a set-off to any additional expense from moving the site of the lock and sluice, the Diamond Harbour road drainage channel, included in the approximate estimate, might be deferred, as it is not necessary to the success of the scheme. For that channel there may be substituted the opening out of the Culpee khall and sluice, which would be an important adjunct to the project.

13. A summary of the works proposed, and an approximate estimate of the cost, is here given—

Work.	Amount.	Total.
	Rs.	Rs.
<i>Kowrapookur Khall.</i>		
Lock and outlet sluice at mouth of Kowrapookur khall	1,50,000	
Extending head of khall from Jhelassi to Mugrah Hât, 5 miles	18,037	
Tools and plant, 3 per cent	5,041	
Establishment, 25 "	47,009	
		2,20,087

Oosti Khall.

Lock and outlet sluice in Diamond Harbour creek	1,50,000
Deepening and straightening Oosti khall from Oosti to Mugrah Hât, 7 miles	25,251
Tools and plant, 3 per cent	5,257
Establishment, 25 "	43,813

2,24,321

Soorjipore and Naraintollah Khall.

Clearing and partial re-excavation of khall from Mugrah Hât to Soorjipore, 8 miles ...	24,858
Tools and plant, 3 per cent	745
Establishment, 25 "	6,215

31,818

Churrial Khall.

Lock and outlet sluice near mouth of Churrial khall	1,20,000
Widening and deepening 5 miles of khall and excavating 3 miles, total 8 miles	28,859
Tools and plant, 3 per cent	4,466
Establishment, 25 "	37,215
	1,90,540
Total	6,66,766

If to this be added the widening and deepening of the khall from Mugrah Hât to Culpee, and the construction of a lock at Culpee, although a lock at that place would hardly

appear necessary, and also the widening and deepening of the present khall from Mugrah Hât to Joynuggur, then there is to be added—

Work.	Amount. Rs.	Total. Rs.
<i>Culpee Khall.</i>		
Lock and outlet sluice at Culpee	1,20,000
Widening and deepening where necessary Culpee khall, a distance of 15 miles	45,000
Tools and plant, 3 per cent	4,850
Establishment, 25 "	41,250
<i>Joynuggur Khall.</i>		
Widening and deepening the khall from near Mugrah Hât to Joynuggur, 6 miles	18,000
Tools and plant, 3 per cent	540
Establishment, 25 "	4,500
		23,040
Total	2,84,140

This added to Rs. 6,66,766 gives a total of Rs. 9,00,906 as the total cost of draining, protecting, and irrigating 260 square miles of land, supplying 80 miles of permanent and cheap means of communication throughout a large district in which there are no roads connecting the main centres of trade, and providing four locks for the passage of boats into the Hooghly river at Tolly's Nullah, Budge-Budge, Diamond Harbour, and Culpee.

14. A special and most important feature in this scheme is that, whilst an effective, comprehensive, and complete system of drainage will be provided, there is also obtained, without additional expense, through localities where there are no roads, a most valuable, convenient, and economical system of water communication, exactly suited to the habits of the people who have been accustomed to, and have in their possession, boats and canoes and "dongahs" which they prefer to any other mode, and, for their requirements, are the cheapest, the easiest, and the best.

In addition to the drainage and navigation provided by this scheme, it also gives a simple and effective means of irrigation in seasons of deficient rainfall by utilizing the drainage channels for conveying water from the rivers during times of flood and high tide; the water will enter by the sluice when open, and flowing along the drainage channels, and into the ditches and khalls, which are very numerous in that part of the district, can be everywhere distributed over the land.

15. As navigation and irrigation are not the subjects of this report, they are not here further alluded to, but as they will be most effectively provided for by the works necessarily required for drainage, it is of great importance that they should be prominently mentioned, in order that the advantages which the drainage scheme offer for opening up lines of communication by that means alone may not be lost sight of, instead of expending money on special works for roads or railways, which in themselves would be greatly more expensive and less effective even for communication alone, whilst the drainage would still be left untouched.

16. The other places within the district are the jheels or bheels referred to in paragraph 5, some of which are salt and others fresh water. The following is a list of the principal of those requiring drainage :—

NAME.	Approximate area, square miles.	REMARKS.
Bheel Burthi	...	10 Fresh water jheel into which flows the drainage of the surrounding land, augmented by inflow from the Hooghly river through the Nowayi nuddee. This bheel is partially cultivated.
Dockerah bheel	...	3 Salt water, brought up by the Soontee nuddee, a branch of the Northern Biddadshurri. Attempts are being made at reclamation by exclusion of salt water. The bheel irregularly cultivated, and the crops uncertain.
Salt Water Lake	...	21 This is a salt water marsh interspersed with jungle. Here and there an attempt is made at cultivation on some of the higher pieces of ground. Generally it is a noisome, pestilential marsh.
Kohalgatchi Eneel	...	9 A salt water marshy jheel, overflowed by the Hurwa Gong and Northern Biddadshurri, which run into each other.
Bulli bheel	...	20 Generally fresh water. The Echamutti overflows into this bheel. It also receives the drainage of the surrounding land. A portion of it is precariously cultivated; portions are covered with thick jungle.

NAME.	Approximate area, square miles.	REMARKS.
Dantbhanga bheel ...	... 18	Salt water enters this bheel in the dry weather, but during the rains the accumulated water is only slightly brackish. A portion of this bheel is usually cultivated; the central part of the bheel is low and always under water.
Boyra do. ...	... 68	Salt water. The tide flows daily into this bheel, entering from the Cobboduk, Culputtoo, and Jaboona rivers. There is some precarious cultivation around the margin of the jheel and on the edges of some of the large "gongs" traversing the bheel. The central portion is thick jungle, interlaced with deep tidal khalls and always under water.
Doodli do. ...	... } 17	Salt water. These form a chain of salt water marshes entered by the tide from the Cobboduk and Moorichap rivers, and extend over a length of about 11 miles on the west side of the Cobboduk river and north of Moorichap river. Numerous salt water tidal khalls interlace these bheels. The high ground on the edges of the khalls is cultivated; the central portions are thick jungle.
Hausal do. }	
Puddo Chowkar bheel	... }	
Gojaulmari do.	... }	
Gopaldangah do.	... }	
Shurribatti do.	... }	
Pathuriaghatta do.	... }	
Fildamar do.	... }	
Kankrabon do.	... }	
Total ...	166	

17. In addition to the above list, giving an aggregate of 166 square miles, there are many other places less definitely defined than those enumerated which require drainage, but these given in the list are the most prominent, and are those which require special works to be designed for their reclamation and improvement.

18. Bulli, Dantbhanga, and Boyra bheels have been surveyed with a view to their reclamation and improvement, but after the surveys and estimates were prepared, a difficulty was found about the proprietary rights. Government claimed to be the proprietor of the greater portion; this was disputed by the zemindars, who claimed the right of possession. This dispute arising in the beginning, and apparently not having been overcome, nothing has been done towards carrying the proposals and recommendations made for this reclamation and improvement into effect, although it was shown that the result would be a highly profitable undertaking.

19. The works required for the drainage of these bheels are of a very simple character and comparatively inexpensive. Most of the bheels are filled with salt water. Obviously the first thing to be done is to exclude the tides. This must be done by embankments and the drainage of the rain water effected by sluices constructed so as to keep out the tide, but allow the outflow of drainage. The khalls everywhere intersecting these bheels are in most cases sufficient for internal drainage channels, and these khalls being brought into communication with the sluices, will be all that is required for drainage.

20. The most important, from its proximity to Calcutta, though not the most extensive of these marshes or bheels, is the Salt Water Lake, which lies on the eastern side of the town of Calcutta adjoining the suburbs, and is nowhere more than three miles from the town itself. The Salt Water Lake extends the full length of the town, overspreading an area of 21 square miles, over which the tide, coming up the Biddadurri and Calcutta canal, overflows. For the most part the lake is very shallow, and on the outflow of the tide a considerable portion is left dry. This lake forms a basin for the reception of the Calcutta sewage. At first the greatest portion of the sewage flows into the canal, and the tide meeting the outward current, brings it back and spreads it over the salt lakes. On the tide receding, a large portion of the lake is left dry, and exhales into the air the odours of foetid sewage, combined with those of decomposing vegetable and animal matter which, when an easterly wind blows, are carried over the town of Calcutta. The character of these exhalations can be best appreciated by going down the canal at low tide from Chitpore to Khoodhatti, about 15 miles down the southern limit of the Salt Water Lake. Whether Calcutta is affected by this, and if so, to what extent, is more a question for medical men to decide than for engineers. Some positive information, however, might be brought to bear on the subject if statistics of the prevalent diseases could be obtained for the different directions of the wind, seeking especially for those that are likely to be produced from an atmosphere tainted with vapours such as those coming from the salt lake. This the Health Officer of Calcutta could no doubt readily obtain.

21. A scheme for the reclamation of the Salt Water Lake was brought out in 1864-65 by a private company, but never came to anything. It was proposed to acquire, by the aid

of the Acquisition Act, the whole of the land occupied by the Salt Water Lake and Tardah jungle comprising 44·55 square miles as below :—

		Square miles.
South lake, or that part south of the central channel	...	14·25
North lake	...	10·8
Tardah jungle	...	19·5
Total area	...	44·55

The intention was to exclude the tidal water by embanking the whole of the Salt Water Lake, and then by a series of channels in connection with the drainage system of Calcutta, which was then being carried out, distribute the sewage of the town over the surface of the lake, and by that means raise the level of the ground, and also bring the whole area into the highest state of fertility.

22. The then condition of the lake, as described by the Commission appointed to

A Commission appointed by a notification No. 153A, dated 17th April 1865, from Government of Bengal, consisting of—

President:

H. L. Dampier, Esq., c. s., Commissioner of Nuddea Division.

Members:

W. Smith, Esq., c. s., Officiating Superintendent Engineer, South Eastern Circle.

J. Fawcus, Esq., M. D.

"the Company's scheme, if carried out, will substitute a cultivated and drained area for the present pestilential swamp and forest." The Company's scheme has not been carried out, but still the *pestilential swamp* remains.

23. There are probably good reasons for the Company's scheme not being carried out, for, on turning to the estimate of the cost as given by the Commission, it appears that, for the Salt Water Lake, the outlay is put down at Rs. 17,53,188 for an area of 25 square miles, and Tardah jungle Rs. 6,37,515 for 19 square miles, making a total of Rs. 23,90,703 for 44 square miles. The return for this expenditure is estimated at a probable 9·99 per cent, with a certainty of not less than 5·09 per cent for the Salt Water Lake taken by itself, and when combined with the Tardah jungle, a return of 10·93 per cent on the total capital outlay of Rs. 23,90,703. A private company could of course look only at the financial results, the sanitary portion of the scheme, excepting so far as it affects its financial success, being only a secondary consideration; and when so large a capital as was proposed to be raised appeared to be required, it is not surprising that difficulties arose in the formation of the company, and that it never became more than a proposal.

24. It does not appear to me that the cost of the reclamation and improvement of the Salt Water Lake would be anything like so costly as was estimated in 1865.

25. The reclamation of those bheels, whether salt or fresh water, will be amply remunerative to their owners. Those where only fresh water is to deal with will in most cases cost less and be more profitable than the salt water bheels, although in the examples worked out salt water bheels appear to yield a higher return. Detailed estimates prepared for the improvement and reclamation of Bulli, Dantbhanga, and Boyra bheels in 1875 showed that—

for Bulli and Dantbhanga bheels, where in the former the water was fresh and the latter only brackish, the cost would be Rs. 7·20 per acre, or Rs. 2·6·5 per beegha, and the annual return on the outlay 18 per cent;

for Boyra bheel, which is salt water, the cost would be Rs. 11·22 per acre, or Rs. 3·12 per beegha, and the annual return on the outlay 20 per cent.

26. These rates may be taken as a rough guide to the cost and the returns that may be expected. It ought, however to be here mentioned that the profit was estimated at a rate for the reclaimed land at little more than a third of what land nearer Calcutta lets, for, whilst the cost may be fairly taken at the maximum, and therefore if an error be made, it will be on the safe side, and the returns will most likely be higher than estimated.

27. Taking then these rates, the cost of drainage and protection, and the profit to be expected from the works, are shown below for each of the bheels given in paragraph 15 :—

NAME.	Area, square miles.	Cost.	Profit, percentage on outlay	REMARKS.	
				Rs.	
Burthi bheel	10	46,080	18 per cent.	Fresh water.	
Dockerali do.	3	13,824	18 "	Brackish.	
Salt Water Lake	21	1,50,801	20 "	Salt water.	
Kohalgatchi bheel	9	64,629	20 "	Ditto.	
Bulli bheel	20	92,160	18 "	Fresh water.	
Dantbhanga bheel	18	84,944	18 "	Brackish.	
Boyra bheel	68	4,58,308	20 "	Salt water.	
Doodli and other bheels near the Cobbedak and Moorichap rivers	17	1,07,716	20 "	Ditto.	
Total	166	10,48,461			

28. Each of these bheels will be a separate work, and can be taken up simultaneously or at different times. They are so far separated from each other that the labour required for one would not affect the supply for the others. The works, as already stated, are of a simple character; but before any designs can be prepared, or exact estimates of the cost prepared, it will be necessary to make a detailed survey, and to have levels taken of each bheel except for Bulli, Dantbhanga, and Boyra bheels, which have already been made, and estimates prepared (see Note by Colonel Haig, Chief Engineer, Public Works Department, Irrigation Branch, dated 4th September 1876, and the papers accompanying it), but no further action taken.

29. The cause of these works not being taken up was not owing to any doubt of the benefits to be derived from them or their financial success, but to the inextricable confusion that had arisen regarding the proprietary rights in the land, the zemindars claiming on one side, basing their claims on vague settlements which might mean anything, without plans or maps of any kind, or even any mention of the area to guide. On the other hand, Government claims, on the ground that no settlements had ever been made; and this latter is probably the truth, if it could only be proved. That the financial success is believed in is evident from an offer having been made by a Calcutta firm to take the land at its present value, and carry out the works proposed without any aid from Government; or they were willing to take at a fair rate Government land only, if that could be ascertained, and carry out the works, provided that the owners of the land not belonging to Government that was benefited should be made to contribute their portion of the cost. This is mentioned to show that there are people who would be ready to invest their own capital in reclaiming, draining, and improving these wastes, if they could obtain the land at a fair rate. The present condition of these bheels is in many cases worse than waste, for they are injurious to health and a nuisance to the locality. As their reclamation will be a profitable investment, it cannot be any hardship on the owner either to have them reclaimed, or give up their possession at their present value.

30. *General Summary.*—The work herein proposed will, if carried out effectively, provide for the general drainage of the 24-Pergunnahs district. The accumulation of water which is complained of during the rains, and for which the embankments are annually cut to get rid of, will be effectually disposed of when required by the 12 outlet sluices proposed in the embankment. The primitive method of cutting the embankments not unfrequently does more harm than good. The cost of the sluices, referred to in paragraph 4, are estimated at Rs. 9,548 each. The twelve mentioned will therefore be Rs. 1,14,516, and if constructed at the places selected, and the side ditches inside the embankments made to communicate as they easily might be made to do, then complete drainage would be effected for all the land between the outer edge of the large basin, having Mugrah Hât for a centre, and the protective embankments.

The works for the drainage, protection, and irrigation of the central basin of 260 square miles are enumerated in paragraph 13, and need here no further recapitulation. They will, besides securing that large area against inundations and draughts, bring a cheap and convenient means of communication within the reach of every village not only within that area itself, but considerably beyond, and thereby place them in direct connection with the local markets, and these local markets, will be brought into direct water communication with Chetlah, the main dépôt of Calcutta, for agricultural produce. There will be 80 miles of arterial channels, which in their turn communicate with innumerable minor channels that extend to every village. The total cost of this work is estimated at Rs. 9,00,906.

The eight jheels, aggregating an area of 166 square miles, are scattered over the northern and eastern part of the district, but mainly in the eastern portion. They vary in character; some are fresh water, some brackish, and others salt. Their condition also varies; some are partially cultivated with only a small portion remaining permanently waste, others are chiefly filled with salt water and entirely waste. The cost of reclamation and improvements of these, which when done would make the land equal to the best in the locality, is estimated at Rs. 10,48,461, and give an annual return of 20 per cent.

31. The surveys and levels of the Mugrah Hât basin, and the khalls passing through and leading to it, have been made; also the survey of Bulli, Dantbhanga, and Boyra bheels has been completed, leaving five of the bheels enumerated yet to be surveyed before the designs for any works that may be decided upon for these five could be prepared.

32. To enable the drainage improvement or reclamation of any or all of these places to be taken up, an Act, similar to Act No. V of 1871, the "Hooghly and Burdwan Drainage Act," is required, or the extension of that Act with such modification as experience has shown to be necessary. Also it will be found that the initiative in improvements of this class like most others, although highly profitable to the owners of the land, must be taken by Government. A few of the zemindars are energetic enough to take an active interest in such matters, but any such action is too frequently more than neutralized by the apathy and jealousy of their neighbours.

Accompanying is a map of 24-Pergunnahs district in six sheets, scale one inch to a mile, showing the proposed sets of embankment sluices, the proposed locks and sluices, and the arterial channels leading to the locks and sluices and the jheels; the latter are colored blue.

J. WHITFIELD, C.E.,

*Exe. Engr., Northern Drainage
and Embankment Divn.*

CALCUTTA,

The 31st March 1879.

RESOLUTION ON THE ANNUAL REPORT OF THE MARINE DEPARTMENT FOR 1879-80.

GENERAL DEPARTMENT—MARINE.

Calcutta, the 29th June 1880.

READ—

The Annual Report of the Port Officer for 1879-80.

LIEUTENANT STIFFE was appointed Port Officer in the course of the year and assumed charge of his duties from Lieutenant Warden on the 5th August last. Lieutenant Warden remains attached to the department for the present as an Assistant Port Officer.

2. The Pilot Service consisted at the end of the year of 67 pilots and 22 leadsmen, or a total of 89 officers. The number of pilots is below the sanctioned strength of the service (70 pilots and 20 leadsmen), but it is at present quite sufficient for the work of the port. The casualties of the past year were one death and one dismissal among the pilots. Four licensed leadsmen qualified for pilots, and were admitted to the mate's grade; and eleven leadsmen apprentices appointed since 1877 passed their first examination as second mates, of whom six have been posted to pilot brigs as second officers, while five continue to run as leadsmen, pending the occurrence of vacancies on pilot vessels. The result of this examination was creditable to the leadsmen apprentices. The Port Officer speaks very favourably of the efficiency of the Pilot Service as a whole, and in this opinion the Lieutenant-Governor fully concurs. Some important changes affecting the distribution of work among the members of the service were carried out during the year. These changes were advocated by the majority of the pilots themselves, and experience has so far shown that they have been attended with good results. Applications for pilots were restricted to the pilot who brings the vessel up, and, failing him, to the pilot of the turn; it was ruled that special pilots should be allowed only to lines of mail steamers, that no pilot below the grade of senior master should run as a special pilot save on vessels of his own grade and tonnage, and that the sanction of Government must be obtained in every case to the employment of a special pilot; and the allotment of tonnage among the different grades was revised. The following scale of tonnage was fixed as compared with the scale previously in force:—

Present Scale.

	Tons.
Mate Pilots up to ...	800
Junior Masters ...	801—1,300
Senior Masters ...	801—1,600
Branch Pilots ...	over 1,600

Former Scale.

	Tons.
Mate Pilots up to ...	800
Junior Masters ...	801—1,175
Senior Masters ...	801—1,300
Branch Pilots ...	over 1,300

The new scale has been introduced tentatively. Monthly statements showing the effect of the change are being submitted by the Port Officer, and the whole subject will be reconsidered after a sufficient period has elapsed.

3. The following statement gives particulars of the shipping of the port during the past ten years:—

Comparative Statement showing the number of Arrivals and Departures of Vessels, their Tonnage, and the number of Sailing Vessels that took Steam during the last ten years, from 1870-71 to 1879-80.

YEAR.	Number of arr. vals.	Tonnage.	Number of de- partures.	Tonnage.	Number of arr. vals and dep- artures.	Average tonnage.	Total tonnage.	Number of ves- sels that took steam inwards.	Number of ves- sels that took steam outwards.	Total number of vessels that took steam both in- wards and out- wards.
1870-71	981	985,585	935	939,851	1,889	1,094	1,989,636	538	675	1,215
1871-72	959	1,119,652	920	1,065,102	1,989	1,172	2,114,154	510	615	1,123
1872-73	948	1,149,648	954	1,153,627	1,692	1,209	2,383,275	480	619	1,099
1873-74	981	1,220,549	946	1,216,868	1,927	1,263	2,457,417	487	592	989
1874-75	927	1,280,694	961	1,281,926	1,888	1,423	2,602,507	408	423	830
1875-76	914	1,274,944	996	1,284,321	1,820	1,406	2,559,266	339	407	830
1876-77	1,161	1,616,701	1,721	1,679,250	2,282	1,443	3,294,951	565	577	1,142
1877-78	1,372	2,656,914	1,521	1,987,041	2,693	1,596	4,643,985	624	574	1,108
1878-79	987	1,430,789	1,000	1,480,985	1,367	1,480	2,911,774	486	487	923
1879-80	986	1,415,979	885	1,420,441	1,791	1,694	2,836,429	403	456	899

If the two years 1876-77 and 1877-78, during which there was an abnormal increase of shipping on account of the large exports of grain to the famine-stricken districts of Southern India, be left out of consideration,

it will be observed from this statement that the number of arrivals and departures in the past year was the lowest of any year since 1869-70, while the aggregate tonnage was the highest, save that for the year 1878-79; and that the average tonnage of vessels visiting the port has been steadily increasing since 1869-70, reaching its maximum (1,584 tons) in the past year. The number of arrivals in the past year was 896, and of departures 895, or a total of 1,791. Of the former, 442 were steamers and 454 sailing vessels, and of the departures, 434 were steamers and 441 sailing vessels. These figures do not include steamers plying to Chandbally, of which there were 111 arrivals and 112 departures, and native craft. Of the steamers that visited the port 133, and of the sailing vessels 153, drew 21 feet and upwards. The branch pilots piloted on an average 4.28 vessels each a month, the masters 2.77, and the mates 2.36 vessels.

4. There were 34 groundings of vessels, 31 of which were attended with no damage, and ten collisions, all of a trifling character. The percentage of accidents on the shipping was 2.45. The only total loss which occurred within the limits of the port was that of the inland steamer *Chunar*, which struck the bank and foundered in Diamond Harbour Reach in May 1879. The vessel was not, however, in charge of a pilot, and the port authorities were in no way responsible for the casualty. A statement appended to the report shows that there has been an immense improvement in the matter of accidents in the port approaches in recent years, notwithstanding the increase in the average size of the vessels visiting the port. Lieutenant Stiffe rightly remarks that this speaks well for the efficiency of the pilots, the accuracy of the surveys, and the management of the port. The Marine Court for the trial of pilots enquired into three cases during the year. Two cases resulted in acquittals and one in the dismissal of the pilot, who was convicted of repeated disobedience of orders. There were also three departmental enquiries. In one case the pilot was acquitted of blame, in another he was reduced to half earnings for three months, and in the third he was cautioned. Although no serious casualty, save that of the *Chunar*, occurred within the limits of the port, the year was marked by three lamentable disasters close to the port. The first of these was the collision which took place between the ship *Brenhilda* and the British India Steam Navigation Company's steamer *Ava* on the night of the 31st May 1879, about 70 miles from the Sandheads, resulting in the foundering of the *Ava*, with the loss of 70 lives. The Court of Enquiry held that the *Brenhilda* was in fault, but refrained from instituting proceedings against the Captain for the suspension of his certificate. The matter was brought by Government before the High Court in its Admiralty Jurisdiction, on charges framed against the Second Officer of the *Ava*, who was the officer of the watch on that vessel, and the Captain of the *Brenhilda*. The former was acquitted, but the certificate of the Captain of the *Brenhilda* was suspended for three months. The decision was confirmed by this Government. The next occurrence was the stranding and subsequent loss of the ship *Lady Belhaven* on the Argo Flat, at the mouth of the Haringhatta river in the Sunderbuns, on the 3rd July 1879. The crew succeeded in reaching the Hooghly in their boats and were rescued. The Captain was proved to have shown carelessness and incompetence in navigating his vessel, and his certificate was suspended for twelve months. The third casualty was the total loss of the ship *Philosopher*, with twelve lives and the entire cargo, on the 26th September 1879, at the mouth of the Davy river on the coast of Orissa. The Court of Enquiry were of opinion that the wreck was due to an unusually strong current running towards the Orissa coast, of the full effects of which the Captain was not in a position to judge. He was accordingly acquitted of blame.

5. The report gives as usual a detailed account of the condition of the channels leading to the port and of the work of the River Survey Department during the year. It appears that the James and Mary Bar was impassable for 37 days to vessels drawing 24 feet, for 19 days to vessels drawing 23 feet, for 12 days to vessels drawing 22 feet, for 6 days to vessels drawing 21 feet, and for one day to vessels drawing 20 feet. The Bellary Bar was also impassable for 43 days to vessels drawing 24 feet, for 14 days to vessels drawing 23 feet, and for 5 days to vessels drawing 22 feet. These periods were confined to the neap tides. Three self-registering tidal-gauges have been sanctioned for the Hooghly, to be maintained under the direction of the Tidal

Department of the Survey of India. The observations will doubtless prove of much advantage in connection with the navigation of the river.

6. The Indian Government steamer *Undaunted*, whose services are lent to this Government as required, performed twenty-one trips to the Sandheads, Mutlah, and False Point during the year. On two occasions she proceeded to the wrecks of the *Lady Belhaven* and the *Philosopher* to render assistance. The state of the pilot-brigs, light-ships, and other vessels belonging to the local Government calls for no remark. The anchor-vessel *Vulcan* was condemned during the year, and another vessel to replace her is under construction in the Government Dockyard. The proposal to use the hull of the *Vulcan* as a floating coal hulk for the river survey vessels at Diamond Harbour, to which the Port Officer alludes in his report, has been abandoned, and the hull should now be sold. There being no vessel available for the work, no anchors or cables were recovered during the year. The stock of articles previously recovered was, however, sold. The amount realized was Rs. 7,788, while the expenditure for the year was only Rs. 1,692.

7. The usual inspection of the refuge-houses on the sea-face of the Sunderbuns was carried out, and the stocks of provisions were replenished. The Port Officer also visited the Orissa ports and Chittagong. Orders were separately passed on the reports submitted by him.

8. The number of certificates granted to steam-vessels surveyed under Acts V of 1862 and I of 1868 was 143 against 152 in the previous year. In one case (the inland steamer *Bengal*), in which a certificate for three months only was granted, one of the boilers of the vessel burst shortly before the expiry of the certificate, causing the death of two men. In passing orders on the report of the special committee appointed to enquire into this explosion, the Lieutenant-Governor has laid down instructions which should greatly diminish the chance of such accidents in future. Fifty-one vessels were inspected under Act VIII of 1876 (the Native Passenger Ships Act) during the year. Only two vessels were registered under the English Merchant Shipping Act, and none under Act X of 1841. The examination for colonial certificates to masters, mates, and engineers resulted in the passing of 11 masters out of 12 candidates, of 2 first mates, 2 second mates, and 2 first-class engineers out of 3 candidates in each case, and of 3 second-class engineers out of 5 candidates. For local certificates, one master passed out of 3 candidates, 7 first mates out of 10 candidates, 12 second mates out of 14 candidates, 1 first-class engineer out of 3 candidates, 2 second-class engineers out of 4 candidates, and 18 engine-drivers out of 20 candidates. Examinations were also held for the first time for the grant of certificates to commanders of inland steamers, who are now bound to obtain such certificates under Act VII (B.C.) of 1879.

9. The only other matters connected with the administration of the port and its approaches which call for notice are the following. Pilotage was made compulsory in the Hooghly for all vessels of a burthen exceeding 200 tons, under section 38 of Act XII of 1875, from the 1st January 1880. Native vessels of less than 500 tons are, for the present, permitted to use native pilots licensed by the Port Officer, and the Chandbally steamers are not required to employ a pilot, provided their commanders hold licenses as steam-tug pilots. Government has under consideration the orders to be issued for carrying out the provisions of the new Indian Merchant Shipping Act VII of 1880. The matter cannot be finally settled before the receipt of reports from officers to whom references have been made, and the framing of rules under certain sections by the Government of India. A new first-order dioptric light was set up during the year in the False Point light-house. The light has been exhibited since the 1st February last.

10. The Committee appointed in March 1879, to enquire into marine expenditure under this Government, submitted their report during the past year. The recommendations of the report have been already considered and disposed of. The Lieutenant-Governor regrets that they were not of such a nature as to enable Government to effect at once any material reduction of expenditure.

By order of the Lieutenant-Governor of Bengal,

A. MACKENZIE,

Secretary to the Government of Bengal.

Rainfall, Weather, and State and Prospects of the Crops.

Statement showing Rainfall, Weather, and State and Prospects of the Crops in the different Districts of Bengal, as reported to Government during the week ending the 26th June 1880.

No.	District, and date of return.	Rainfall at Sudder Station in inches.	Character of the weather, state and prospects of the crops, and state of health at date.
BENGAL			
<i>Western Districts.</i>			
1	Burdwan, June 26 '80	3.95	Weather—seasonable. State and prospects of crops good. Public health good.
	Cutwa	3.70	
	Raneeungunge	2.32	
	Culna	0.35	
2	Bankura, " 26 "	2.61	Weather—showery and sunny alternately during week. Cotton and sesamum being reaped, but damaged by late rains. Early <i>amun</i> rice being transplanted.
	Bishenpore	1.34	Rain general. Very little sickness reported.
3	Beerbohm, " 26 "	5.22	Weather—seasonable. Everything very forward. Transplantation commenced.
4	Midnapore, " 26 "	1.95	Weather—seasonable. State and prospects of crops favourable.
5	Hooghly, " 26 "	0.50	Weather—cloudy during week with slight rain. Prospects of sugarcane, late rice and jute good. Late rice still being sown in places. Public health good, but a few cases of cholera in Serampore thanas.
	Howrah, " 28 "	3.21	Weather—seasonable. State and prospects of crops favourable.
	Moheshrekha	2.00	
<i>Central Districts.</i>			
6	24-Pergunnahs, June 26 '80	2.23	Weather—seasonable. Rice and jute plants promising. Transplanting of late rice commenced. Some cases of cholera in Dum-Dum.
7	Nuddea, " 26 "	0.95	Weather—cloudy, rainy, and sultry. Prospects good. Crops which were submerged in low-lying lands by late heavy rains have partially recovered.
	Kooshtea	5.54	
	Meherpore	1.17	
	Chooadanga	1.42	
	Ranaghata	0.15	
	Bongong	0.40	
8	Jessore, " 26 "	1.11	Weather—cloudy, with passing showers. Prospects of all crops on ground good.
	Jhenidah	3.88	Rivers rising. Health good.
	Magoorah	2.50	
	Narail	2.81	
	Khoolna	2.10	
	Bagirhat	1.29	
9	Moorshedabad, " 26 "	0.54	Weather—hot. Prospects of crops good. Fever in four police stations of Sudder sub-division; otherwise public health good.
10	Dinagepore, June 25 '80	5.38	Rain has continued with short intermission every day of week. Damage to autumn crops not extensive. Transplanting going on, and agricultural operation for winter rice everywhere active.
11	Rajshahye, " 26 "	0.62	Weather—hot and cloudy; more or less rain throughout district. Heavy rain in some parts has caused considerable damage to sesamum. Early and late rice and jute also partially damaged. Prospects of crops otherwise generally good. Public health good. Rice 16 to 20 seers per rupee. Ganges rising rapidly.
12	Rungpore, " 25 "	2.71	Weather—has cleared up. Damage to early rice by incessant rain of last two weeks not considerable. State and prospects of crops on the whole good. Public health good.
	Bagdogra	6.15	
	Kurigram	5.63	
	Gaibanda	1.58	
13	Bogra, " 26 "	1.85	Weather—moderately hot in daytime, with generally a breeze at night. Break in rains likely to be beneficial. Some damage from floods, but general prospects fairly good.
14	Pubna, " 26 "	4.20	Rain every day. Crop prospects good. No damage done yet.
15	Darjeeling, " 26 "	6.75	Frequent heavy rain during week. Early rice both in Hills and in Terai getting on well. <i>Chota bhoota</i> in hills being reaped.
16	Julpigoree, " 26 "	9.19	Rain daily throughout week. Heavy rain has injured most of growing crops. Late rice sowings progressing fairly. Jute and sugarcane not doing well, but may recover. General health good; small-pox lessened.
	Cooch Behar, " 24 "	8.93	Rain very generally and equally distributed. Occasionally heavy thunder. Continued rain has done much harm to early rice and jute, especially in low lands. Late rice being sown. Public health good. Price of rice risen a little.
	Dinhatta	9.29	
	Mathabhanga	7.77	
	Meckligrunge	8.51	
<i>Eastern Districts.</i>			
17	Dacca, June 26 '80	2.98	Weather—seasonable. Harvesting of early rice continues. Prospects of late rice and sugarcane good. Public health good.
	Manickgunge (for week ending 23rd June.)	2.10	
	Moonshigunge (for week ending 23rd June.)	4.14	
18	Furreedpoore, " 27 "	2.97	Weather—showery. Early rice being reaped; outturn satisfactory. Prospects of crops and public health good.
	Goalundo	1.37	
	Madaripore	1.40	
19	Backergunge, " 24 "	3.34	Weather—seasonable. Prospects of early rice fairly good. Cultivation of late rice in progress. Public health good.
20	Mymensingh, " 25 "	2.08	Weather—seasonable. State and prospects of crops good.
21	Tipperah, " 26 "	2.21	Weather—rain and wind in north of district. Fair with occasional showers in centre and south. Crops generally in good condition, but in north rice on low lands suffered to some extent from heavy rain.
	Brahmanbaria	8.04	
	Chandpore	2.75	

No.	District, and date of return.	Rainfall at Sudder Station in inches.	Character of the weather, state and prospects of the crops, and state of health at date.
BENGAL.—(Continued.)			
<i>Eastern Districts.—(Continued.)</i>			
CHITTAGONG DIVN.	22 Chittagong June 29 '80	0.92	Weather—variable. Prospects of crops good. Prices stationary. Cattle disease continues.
	23 Noakhally, " 24 "	4.36	Three or four days comparatively dry, followed by heavy rain. Rice continues to do well. Some cases of small-pox.
	24 Chittagong Hill Tracts " 22 "	10.95	Very heavy rain during early part of week. Paddy, cotton and Indian-corn in jums doing well. Prospects fairly good. Lands being ploughed for late rice. Fever very prevalent.
	Hill Tipperah. " 23 "	1.72	Weather—cool. <i>Sathi</i> paddy germinating. Late rice being sown. Public health good.
BEHAR.			
PATNA DIVN.	25 Patna, June 26 '80	0.28	Weather—seasonable. Sowing of autumn crops and paddy in progress.
	Barrh	Nil	
	Behar	0.01	
	Dinapore	0.23	
	26 Gya, " 26 "	0.88	Weather—cloudy and sunshine. Maximum reading in shade 105.5°. Paddy being sown in places. Rain wanted. Public health generally good.
	27 Shahabad, " 26 "	0.24	Weather—cloudy and warm. Prospects of sugarcane and indigo continue good. <i>Cheqna</i> has done well. Cholera in a mild form in certain isolated villages.
	28 Durbhunga, " 26 "	3.46	Weather—cloudy, with easterly wind. Sowing of autumn crops and paddy still in progress; both coming up well. Indigo manufacture commenced. Some fever at head-quarters, and cholera reported on Nepal frontier.
	29 Mozuferpore, " 26 "	1.97	Weather—cool and cloudy. Transplanting of rice seedlings and <i>muriva</i> commenced. Maize and <i>sathi</i> rice being sown. Prospects satisfactory. Public health good.
	Hajeevpore	0.30	
	Seetamarhee	1.10	
	30 Saran, " 26 "	1.43	Weather—hot and cloudy. Rain general. Ploughing and sowing going on briskly. Prospects generally good.
	Sewan	1.87	
	31 Chumparue, " 26 "	0.26	Weather—seasonable. State and prospects of crops very good. Sowing of autumn crops commenced. Cholera abating gradually.
	32 Monghyr, June 26 '80	1.58	Weather—hot. Heavy rain on night of 24th. Sowings fast progressing. <i>Makai</i> beginning to appear above ground. Mango has been a good crop. Indigo manufacture commenced with good prospects.
	Bagooserai	0.11	
	Jamui	Nil	
BRAHMAPURO DIVN.	33 Bhagulpore, " 26 "	0.62	Weather—showery, easterly winds, cloudy, hot sun. Ploughing and sowing going on rapidly. Indigo manufacture commenced. Sugarcane promising. Indian-corn growing well. Public health good.
	34 Purneah, " 26 "	1.34	Heavy showers daily. Sun at intervals. Some damage done to autumn crops. Prospects of jute and winter rice good.
	Arrareah	3.60	
	35 Maldah, " 26 "	1.53	Weather—sultry, but tempered by easterly breeze and daily rain latterly. Autumn crops, late rice, and <i>makai</i> thriving. Common rice 17 seers a rupee. Public health fair.
	36 Sonthal Perghs, " 26 "	2.46	Weather—seasonable. Showers and sunshine. State and prospects of crops good.
	Deoghar	0.27	
	Goda	0.29	
ORISSA DIVN.	Jamtara	0.34	
	Rajmehal	0.25	
ORISSA.			
37 Cuttack June 26 '80	2.82	Weather—seasonable. Sufficient rainfall for the present. Rice growing well. Sporadic cases of cholera reported. Small-pox abating. Common rice 16 $\frac{1}{2}$ to 20 seers per rupee.	
	Jajpore	2.24	
	Kendrapara	2.7	
	38 Pooree, " 24 "	5.54	Weather—seasonable. Sowing of late rice going on rapidly. Miscellaneous crops promising well. Common rice 20 to 24 seers per rupee. Public health good.
39 Balasore, " 25 "	3.93	Weather—showery. Ploughing and sowing continue. Public health good.	
	Khoorda	3.73	
CHOTA NAGPORE.			
<i>South-West Frontier Agency.</i>			
40 Hazareebagh, June 25 '80	0.51	Weather—cool and pleasant, with occasional bursts of heavy rain. Prospects of autumn crops good. Ploughing and sowing going on everywhere. Prices stationary. General health good.	
41 Lobardugga, " 26 "	1.90	Weather—seasonable. Rain almost daily. Early sowings doing well, and prospects continue favourable. Isolated cases of cholera reported from Palamow. Small-pox seems to be abating. Prices stationary.	
42 Singbham, " 25 "	1.71	Weather—cloudy, with occasional rain. Prospects of crops favourable. General health good.	
43 Manbham, " 26 "	1.66	Weather—showery, with fine intervals. Sufficient rain for cultivators. Field-work progressing. Prospects at present favourable. Public health good.	
Govindpore			
0.13			

Published for general information.

CALCUTTA, STATISTICAL DEPT.,

The 29th June 1880.

COLMAN MACAULAY,

Offy. Secy. to the Govt. of Bengal.

Results of the Meteorological Observations taken at the Alipore Observatory from
20th to 26th June 1880.

Month.	Date.	Maximum in sun.	Mean pressure barometer at 32° Fahr.	TEMPERATURE.			HYGROMETER.			WIND.			Miles recorded.	Rain.	WEATHER.
				Mean.	Maximum.	Range.	Minimum.	Mean wet bulb.	Vapour tension.	Dew point.	Humidity.	Prevailing direction.			
1880.															
June	20th	139°3	29°601	81°5	90°4	12°1	78°3	78°7	0°949	77°6	88	Till 9:45 A.M. S E by S, till 12:45 P.M. chiefly S S W through S, till 1 P.M. N by W through S W, W and N W, till 6:45 P.M. S S W through N W, W and S W, till 8 P.M. N N W through S W, W and N W, till midnight S W through N W and W.	117	1°71	Cloudy, o g p d t.
"	21st	152°9	685	83°2	90°5	14°4	76°1	79°7	970	78°3	85	Till 3 A.M. S W, till 9 A.M. S, till midnight chiefly S S W.	57	0°01*	Cloudy, o g.
"	22nd	154°3	673	84°0	90°6	10°6	80°0	81°2	1°028	80°1	88	Till 5:45 A.M. S by W, till 1:30 P.M. E S E through S and S E, till midnight N by E through S, S W and N W.	74	0°09	Cloudy, o g + d p f w.
"	23rd	154°5	609	82°2	86°5	7°1	79°4	79°3	0°963	78°1	87	Till 2:45 A.M. N W by N through N, till 5:30 P.M. S S E through N E, E and S E, till midnight S E.	143	0°16	Cloudy, o d p t.
"	24th	160°7	638	83°0	87°3	9°2	78°1	79°4	955	77°8	84	Till 12:30 P.M. E S E, till midnight chiefly S S E.	171	Nil	Cloudy, o g d.
"	25th	150°0	589	82°6	88°1	10°4	77°7	79°5	966	78°2	87	Till 11 A.M. E through S E, till midnight chiefly S E by S.	155	0°38†	Day cloudy, light, chiefly clear, o g d p.
"	26th	154°5	552	81°0	88°3	9°9	78°4	78°4	940	77°4	89	Chiefly E S E.	212	0°61	Day cloudy, night chiefly clear, o g p t.

* Fell since 7 P.M. of the 20th.

† 0°06 fell since 9:40 P.M. of the 24th.

The mean pressure of the seven days	...	...	...	...	...	...	...	...	...	...	...	...	...	Inches.
The average pressure of the corresponding period for 24 years, S. G. Office	...	...	...	...	...	...	...	...	...	...	...	...	...	29.592
The mean temperature of the seven days	...	...	...	...	...	...	...	...	...	...	...	...	...	82.5
The average temperature of the corresponding period for 24 years, S. G. Office	...	...	...	...	...	...	...	...	...	...	...	...	...	84.6
The extreme variation of temperature during the seven days	...	...	...	...	...	...	...	...	...	...	...	...	...	14.5
The maximum temperature during the seven days	...	...	...	...	...	...	...	...	...	...	...	...	...	90.6
The highest velocity of the wind in one hour during the seven days	...	...	...	...	...	...	...	...	...	...	...	...	Miles.	15
The highest pressure of the wind on one square foot during the seven days	...	...	...	...	...	...	...	...	...	...	...	...	lbs.	9
The mean relative humidity during the seven days	...	...	...	...	...	...	...	...	...	...	...	...	...	%.
The average relative humidity of the corresponding period for 24 years, S. G. Office	...	...	...	...	...	...	...	...	...	...	...	...	...	84
The total fall of rain from 20th to 26th June 1880	...	...	...	...	...	...	...	...	...	...	...	...	Inches.	2.96
The average fall of the corresponding period for 24 years, S. G. Office	...	...	...	...	...	...	...	...	...	...	...	...	...	2.58
The total fall from 1st January to 26th June 1880	...	...	...	...	...	...	...	...	...	...	...	...	...	20.84
The average fall of the corresponding period for 24 years, S. G. Office	...	...	...	...	...	...	...	...	...	...	...	...	...	19.81

The mean pressure, temperature, &c., are deduced from observations made at 6h, 10h, 16h and 22h, and from the traces of the barograph and thermograph.

The maximum and minimum temperatures are obtained from self-registering thermometers. All the thermometers are verified, and the readings have been corrected to a standard constructed and verified at the Kew Observatory. They are exposed under a thatched shed open at the sides, and are suspended four feet above the ground.

The barometer readings are corrected approximately to those of the standard Newman's No. 86, formerly at the Surveyor-General's Office.

The hygrometric elements are obtained from Tables III, IV, and V of the official tables computed in the Meteorological Office, and based on Regnault's modifications of August's formula.

The direction and movement of the wind are taken from the trace of a Beckley's anemograph.*

The mouth of the rain-gauge is one foot above the ground.

o overcast, g gloomy, p passing temporary showers, d drizzling rain, t thunder, l lightning, f fog, w dew.

METEOROLOGICAL OFFICE, INDIA,

The 28th June 1880.

JOHN ELIOT,

Meteorological Reporter to the Government of Bengal,
for Meteorological Reporter to the Government of India.

PUBLIC WORKS DEPARTMENT, IRRIGATION BRANCH, BENGAL.

Statements showing the total amount of Traffic and Tolls on the Canals for the month of April 1880.

ORISSA CIRCLE.

Kendrapara Canal and its branch to Gundukia on the Gobri River.

LENGTH OF CANAL OPEN—54 MILES.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			

LOCAL TRAFFIC.

(1) PRIVATE.

		Mds.	Rs.				Rs. A. P.	A. P.
5	Bamboos	290	45	597	21	840	18 4 0	.....
1	Cotton	100	1,000	240	9	108	2 4 0	.....
1	Coriander	100	400	183	7	210	5 4 0	.....
1	Gastor-seed	80	300	197	7	294	7 0 0	.....
1	Dry fish	20	140	43	2	84	0 8 0	.....
1	Earthen pots	50	10	97	3	72	3 0 0	.....
201	Empty boats	.....	.....	22,641	809	27,252	887 12 0	.....
3	Gylals	50	10	135	5	109	2 8 0	.....
12	Gunny-bags	200	1,200	454	16	640	13 8 0	.....
12	Gram	120	450	237	9	290	6 4 0	.....
1	Gallnuts	100	200	267	10	420	10 9 0	.....
7	Hides	1,880	18,500	2,968	106	3,965	111 12 0	.....
31	Jaggery	3,900	19,500	7,598	268	5,770	165 8 0	.....
2	Kharee	600	1,500	1,069	38	1,596	42 0 0	.....
12	Mustard-seed	220	1,100	381	14	430	13 0 10	.....
5	Miscellaneous	560	4,000	1,242	44	1,848	47 0 0	.....
22	Miscellaneous goods, &c., of Messrs. Bullock, Wellisted & Co.	.....	.....	24,849	873	34,920	702 4 0	.....
2	Oil-cake	300	300	500	18	756	14 4 0	.....
41	Paddy	5,250	10,500	9,190	328	11,296	284 12 0	.....
6	Passengers (8 in number)	.....	.....	1,177	42	1,282	23 4 6	.....
60	Rice	17,070	67,940	30,229	1,079	45,110	887 8 0	.....
25	Sleeper	8,700	34,800	15,153	542	21,580	579 0 0	.....
11	Spices	2,150	45,000	4,386	157	6,594	171 0 0	.....
3	Straw	100	20	256	8	96	2 8 0	.....
23	Salt	4,330	21,650	7,196	257	7,508	133 0 0	.....
12	Salt fish	200	2,400	407	15	690	9 8 0	.....
12	Turmeric	110	550	283	10	395	11 0 0	.....
7	Til	1,300	6,500	2,445	87	3,654	95 0 0	.....
12	Timber	330	1,320	649	23	440	7 12 0	.....
4	Wheat	500	2,240	869	31	1,198	23 8 0	.....
485	Total	48,670	2,39,905	1,35,425	4,838	179,246	5,989 13 4	0 4 2
664	Total of same month last year*	65,916	2,95,837	1,83,051	6,539	242,669	5,536 4 10	0 4 4
	MISCELLANEOUS.							
15	Bamboos (21,285 in number)	.....	520	.....	.....	71 7 5	.....	.....
27	Passengers (551 in number)	.....	84	.....	.....	318 2 1	.....	.....
..	Timbers (21 in number)	.....	.....	.....	.....	10 7 0	.....	.....
40	Total	.....	604	.....	.....	400 0 6	.....	.....
31	Total of same month last year	.....	541	.....	.....	325 15 6	.....	.....

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

		Mds.	Rs.				Rs. A. P.	A. P.
3	Bricks	500	20	1,105	39	585	11 0 0	.....
34	Empty boats	.....	.....	6,579	228	459	91 12 0	.....
1	Miscellaneous	400	3,000	735	25	640	21 12 0	.....
22	Laterite rubble	5,800	90	11,137	358	5,970	107 8 0	.....
46	Laterite stone	10,700	160	21,494	768	11,520	236 12 0	.....
2	Sandstone	500	10	717	20	390	6 12 0	.....
1	Stores, &c.	50	500	145	5	210	5 0 0	.....
49	Total	17,650	3,700	41,712	1,400	19,765	339 8 0	0 5 2
16	Total of same month last year	700	432	1,065	71	1,000	34 12 0	0 4 2
	MISCELLANEOUS.							
1	Bamboos (1,460 in number)	.....	40	.....	.....	1 12 0	.....	.....
82	Boats passed free	.....	.....	.....	.....	.....	.....	.....
83	Total	.....	40	.....	.....	1 12 0	.....	.....
62	Total of same month last year	.....	50	.....	.....	17 8 0	.....	.....

* In comparing with the corresponding month of last year, the private trade shows a decrease of Rs. 1,473, which is due to the falling off of traffic in items paddy, spices, jaggery, sleeper, salt, bamboos, miscellaneous goods, empties, &c.

† A memorandum of free boats is attached.

Kendrapara Canal—continued.

Number of Boats #	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			
ABSTRACT.								
525	Private, including miscellaneous	48,670	2,40,509	1,35,425	4,838	179,246	4,389 13 10	.....
182	Government stores, including miscellaneous	17,350	3,830	41,712	1,400	19,765	541 4 0	.....
707	Grand Total ...	66,020	2,44,339	1,77,137	6,328	199,011	4,931 1 10*	.....
787	Grand total of same month last year ...	66,616	2,96,860	1,85,036	6,610	244,269	5,914 8 4	.....

* Of this, Rs. 953-10-0 is the total collection of Gobri canal locks, and Rs. 3,977-7-1 is the collection of Kendrapara canal locks.

MEMO.		Rs.	A. P.	A. P.
Unrecovered balance on the 1st of the month	...	2,575	8 4	.....
Amount of tollage for the month	...	4,931	1 10	.....
Total	...	7,506	10 2	.....
Amount credited in the accounts for the month	...	3,950	4 5	.....
Balance at the end of the month	...	3,556	5 9	.....

MEMO. OF FREE BOATS.

PARTICULARS.	No. of boats.	Maunds.	Tonnage.	Tollage realizable. Rs. A. P.
Passenger boats of Government officials	5	525	19	14 8 0
Boats conveying materials for Jamboo harbour works	53	17,130	611	684 0 0
Boats returning empty ditto	39	9,513	340	370 0 0
Steamers, &c., of Messrs. Bullock, Wellsted & Co.	5	2,196	78	63 0 0
Total	82	29,364	1,048	1,131 8 0

High Level Canal, Range I.

LENGTH OF CANAL OPEN—34 MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

1	Bena grass ...	100	20	240	9	252	6 12 0	.....
1	Cotton ...	300	5,000	630	23	469	12 8 0	.....
1	Clothes ...	10	200	25	1	34	0 12 0	.....
31	Empty boats ...	...	...	2,341	84	2,258	52 2 9	.....
2	Gram ...	150	600	281	10	89	2 12 0	.....
2	Gingelly ...	400	1,600	695	25	840	22 2 0	.....
3	Jaggery ...	600	3,000	1,066	39	546	16 12 0	.....
3	Paddy ...	300	600	563	20	680	15 12 0	.....
20	Passengers (106 in number) ...	...	...	2,877	102	3,301	88 13 3	.....
7	Rice ...	500	2,900	993	55	1,205	27 12 0	.....
1	Sleeper ...	200	650	490	18	595	14 4 0	.....
10	Salt ...	1,500	7,500	2,985	107	3,212	83 0 0	.....
8	Sundries ...	800	1,200	1,499	28	1,730	41 11 0	.....
1	Straw ...	50	10	123	4	24	1 10 0	.....
5	Tamarind ...	500	1,000	1,100	39	1,336	32 4 0	.....
96	Total	5,410	21,880	15,927	569	16,562	412 5 0	0 4 8
113	Total of same month last year*	7,972	24,387	22,061	787	23,586	619 3 6	0 4 6
MISCELLANEOUS.								
...	Demurrage on boats ...	...	...	...	...	...	4 8 0	.....
...	Total	...	...	...	...	...	4 8 0	.....
...	Total of same month last year	...	...	...	...	...	...	.....

* In comparing with the corresponding month of last year, the private trade shows a decrease of Rs. 203, which is due to the falling off of traffic in items paddy, rice, salt, passenger, &c.

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

3	Bricks ...	600	85	960	34	1,163	28 8 0	.....
16	Empty boats ...	...	...	2,498	89	713	24 8 0	.....
30	Laterite stone ...	7,000	110	13,534	453	483	134 0 0	.....
2	Stores, &c. ...	100	500	211	8	764	6 0 0	.....
51	Total	7,600	645	17,193	614	3,125	19C 0 0	0 11 9
218	Total of same month last year	18,420	443	25,082	2,682	13,934	807 8 0	1 0 0
MISCELLANEOUS.								
...	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
...	Total	...	...	...	...	...	...	.....
...	Total of same month last year	...	...	...	...	...	4 4 0	.....

High Level Canal, Range I—continued.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			

ABSTRACT.

		Mds.	Rs.				Rs. A. P.	A. P.
96	Private, including miscellaneous	5,410	21,880	15,927	569	16,562	416 13 0	.....
51	Government stores, including miscellaneous	7,600	645	17,193	614	3,125	193 0 0	.....
147	Grand Total	13,010	22,525	33,120	1,183	19,687	609 13 0	.....
337	Grand total of same month last year	36,392	24,898	97,146	3,469	30,520	1,400 15 6	.....

MEMO

Unrecovered balance on the 1st of the month	...	...	...	...	...	527 10 9
Amount of tollage for the month	...	...	...	...	...	600 13 0
				Total	...	1,127 7 9
Amount credited in the accounts for the month	...	...	...	...	...	678 14 3
Balance at the end of the month	...	...	...	...	...	458 9 6

Taldunda Canal.

LENGTH OF CANAL OPEN—27 MILES.

LOCAL TRAFFIC

(1) PRIVATE

2	Paddy	...	...	...	...	729	900	1,003	36	447	5 3 6	.....
1	Rice	...	...	...	...	226	675	506	11	165	3 1 0	.....
1	Timber	...	...	...	...	460	156	700	25	875	3 8 0	.....
2	Fuel	...	...	...	...	536	50	800	29	57	4 0 0	.....
2	Bamboos	...	...	...	...	705	150	1,155	41	495	5 12 6	.....
5	Straw	...	...	...	...	1,081	197	1,917	68	513	9 9 9	.....
3	Lime	...	...	...	...	1,088	305	1,746	62	934	14 15 3	.....
1	Oil refuse	...	...	...	...	267	500	597	21	468	5 15 6	.....
33	Passengers	...	...	...	...	...	...	19,872	710	1,419	99 6 0	.....
26	Empty	...	...	...	...	...	...	3,803	136	1,900	24 5 3	.....
76	Total	...	5,002	2,537	31,590	1,130	6,773	175	12 9	0 4 9	.....
84	Total of same month last year	...	8,031	14,911	37,705	1,347	10,727	222	5 0	0 3 9	.....
	MISCELLANEOUS.											
40	Timber	...	...	...	...	145	.....	.....	.....	15 0 0	.....
3,050	Bamboos	...	...	...	...	75	.....	.....	.....	7 10 0	.....
623	Passengers	...	...	...	...	.....	.....	.....	.....	3 3 0	.....
	Total	...	.....	220	.....	.....	.....	.....	.....	25 13 6	.....
	Total of same month last year	...	.....	92	.....	.....	.....	.....	.....	12 12 6	.....

(2) STORES AND MATERIALS FOR IRRIGATION WORKS

ABSTRACT.

76	Private, including miscellaneous	5,692	5,657	31,899	1,130	6,773	201	16	3	72
20	Government stores, including miscellaneous	5,982	508	8,068	288	553	40	6	0	20
	Grand Total	...	8,174	3,565	39,967	1,427	7,326	242	0	3
	Grand total of same month last year	...	8,051	15,063	37,705	1,347	10,727	235	1	2

Memo.

Unrecovered balance on the 1st of the month	... ... ... ... ... ... ... ... ... ... ... ...	0 0 0
Amount of tollage for the month	... ... ... ... ... ... ... ... ... ... ... ...	242 0 3
		Total ...
Amount credited in the accounts for the month	... ... ... ... ... ... ... ... ... ... ... ...	242 0 3
Balance at the end of the month		142 12 5

High Level Canal, Range II.
LENGTH OF CANAL OPEN—12½ MILES.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of Cargo.	Mds.	Tons.			

LOCAL TRAFFIC.

(1) PRIVATE.

		Mds.	Rs.				Rs. A. P.	A. P.
1	Charcoal	120	150	212	8	96	4 0 0	.....
20	Empty boats	.....	.....	1,855	65	744	33 0 6	.....
5	Firewood	800	80	1,438	51	613	27 8 0	.....
4	Jaggery	500	3,500	830	30	260	15 8 0	.....
3	Moong	400	1,600	754	27	334	15 0 0	.....
5	Paddy	650	1,300	1,149	41	530	23 0 0	.....
10	Passengers (57 in number)	.....	.....	1,885	68	836	35 14 3	.....
10	Rice	1,050	4,200	1,650	59	767	30 0 0	.....
8	Salt	2,250	10,850	4,260	150	1,431	82 0 0	.....
1	Soap stone	100	100	236	8	88	4 8 0	.....
67	Total	5,870	21,780	14,209	567	5,798	269 6 9	0 89
91	Total of same month last year	4,779	19,264	19,941	713	7,887	380 7 6	0 93
MISCELLANEOUS.								
Small dongahs (18 in number)	.....	.....	.....	.....	.....	.....	32 13 0	.....
Bamboos (2,700 in number)	.....	70	.....	.....	.....	.....	6 10 0	.....
Timber (6 in number)	.....	24	.....	.....	.....	.....	1 8 0	.....
...	Total	.....	94	.....	.....	.....	42 15 0	.....
3	Total of same month last year	.....	10	.....	.....	.....	51 0 0	.....

In comparing with the corresponding month of last year, the private trade shows a decrease of Rs. 119, which is due to the falling off of traffic in items paddy, jaggery, timber, passengers, and empties, &c.

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

		Mds.	Rs.				Rs. A. P.	A. P.
3	Bricks	500	30	996	36	432	19 8 0	.....
20	Empty boats	.....	.....	5,384	193	2,218	104 0 0	.....
2	Firewood	500	50	835	30	360	16 8 0	.....
24	Gravel	2,600	40	4,923	176	1,056	95 0 0	.....
10	Laterite stone	3,500	50	6,943	248	2,976	137 0 0	.....
2	Lime shooting	350	85	668	24	96	13 0 0	.....
10	Rubble stone	3,000	45	5,289	189	2,679	84 8 0	.....
71	Total	10,450	300	25,038	896	9,217	467 8 0	0 97
146	Total of same month last year	21,310	732	34,786	1,956	23,328	1,066 8 0	0 88
MISCELLANEOUS.								
Small dongahs (9 in number)	.....	.....	.....	.....	.....	.....	1 8 0	.....
...	Total	.....	.....	.....	.....	.....	1 8 0	.....
...	Total of same month last year	.....	.....	.....	.....	.....	4 11 0	.....

ABSTRACT.

		Mds.	Rs.				Rs. A. P.	A. P.
67	Private, including miscellaneous	5,870	21,874	14,209	567	5,798	312 5 9	.....
71	Government stores, including miscellaneous	10,450	300	25,038	896	9,217	469 0 0	.....
138	Grand Total	16,320	22,174	39,247	1,403	15,015	781 5 9	.....
239	Grand total of same month last year	26,089	20,066	74,727	2,669	31,215	1,602 10 0	.....

MEMO.

Unrecovered balance on the 1st of the month	...	...	...	...	...	435 1 9
Amount of tollage for the month	...	...	...	...	...	781 3 9
Amount credited in the accounts for the month	...	...	...	...	Total	1,216 7 6
Balance at the end of the month	...	...	...	...	...	584 2 9
						632 4 9

High Level Canal, Range III.
LENGTH OF CANAL OPEN—6½ MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

		Mds.	Rs.				Rs. A. P.	A. P.
1	Empty boat	.....	.....	177	6	84	3 5 0	.....
3	Jaggery	300	1,500	506	18	253	11 8 0	.....
3	Paddy	350	700	506	18	253	11 8 0	.....
10	Passengers (42 in number)	.....	.....	1,380	50	350	25 5 7	.....
1	Salt	250	1,150	625	19	266	10 8 0	.....
18	Total	900	3,350	3,094	111	1,264	62 5 7	0 99
33	Total of same month last year	615	2,045	7,849	280	4,760	130 1 6	0 60
MISCELLANEOUS.								
Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	Total	.....	.....	.....	.....	.....	.....	.....
1	Total of same month last year	.....	40	.....	.....	.....	1 14 0	.....

In comparing with the corresponding month of last year, the private trade shows a decrease of Rs. 90, which is due to the falling off of traffic in items passenger, rice, and empties.

High Level Canal, Range III—continued.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

No.	Nil.	Mds.	Rs.	Nil.	Nil.	Nil.	Rs. A. P.	A. P.
		Nil.	Nil.				Nil.	Nil.
25	Total of same month last year	1,577	128	5,537	199	1,435	102 0 0	1 3 6

ABSTRACT.

No.	Private, including miscellaneous	900	3,350	3,094	111	1,204	62 5 7	.....
	
18	Government stores, including miscellaneous	900	3,350	3,094	111	1,204	62 5 7	.....
18	Grand Total	900	3,350	3,094	111	1,204	62 5 7	.....
59	Grand total of same month last year	2,192	2,213	18,386	479	6,195	253 15 6	.....

MEMO.

Unrecovered balance on the 1st of the month	34 7 6
Amount of tollage for the month	62 5 7
	<hr/>
Total	96 13 1
Amount credited in the accounts for the month	58 11 6
	<hr/>
Balance at the end of the month	38 1 7

SOUTH-WESTERN CIRCLE.

Midnapore Canal.

LENGTH OF CANAL OPEN—53 MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

47	Betel-leaves	2,285	12,870	7,965	.....	.....	44 3 9	.....
2	Betel-nuts	100	1,000	425	.....	.....	5 11 6	.....
4	Bricks and tiles (2,800 in number)	320	75	1,300	.....	.....	7 4 0	.....
24	Brass and copper and their manufactures	4,365	1,65,260	10,520	.....	.....	91 11 3	.....
30	Coal and coke	7,690	2,864	15,545	.....	.....	149 15 3	.....
7	Cotton, raw	655	12,640	1,610	.....	.....	18 2 6	.....
46	Cotton twist and yarn (European)	5,960	2,02,640	15,905	.....	.....	145 0 3	.....
5	Do. piece-goods (European)	1,090	28,500	5,250	.....	.....	25 8 3	.....
9	Do. ditto (Indian)	208	19,445	1,185	.....	.....	7 5 6	.....
34	Curd	2,355	6,725	6,600	.....	.....	59 0 6	.....
2	Cocoanuts (3,000 in number)	30	90	250	.....	.....	3 5 6	.....
221	Empty boats	.....	91,975	.....	.....	.....	514 15 3	.....
41	Earthenware	4,510	5,984	11,910	.....	.....	114 14 6	.....
15	Firewood	987	248	2,480	.....	.....	11 9 0	.....
2	Fruits and nuts of all kinds	220	440	550	.....	.....	4 13 9	.....
90	Gram and pulse	13,430	55,455	29,030	.....	.....	244 3 3	.....
2	Goats and sheep (116 in number)	26	255	230	.....	.....	3 7 3	.....
2	Gunny-cloth (120 pieces)	69	360	325	.....	.....	1 3 6	.....
3	Horns	250	2,300	675	.....	.....	5 14 6	.....
25	Hides of cattle, untanned (2,400 in number)	475	3,200	950	.....	.....	12 13 0	.....
2	Indigo-seed	550	4,300	1,275	.....	.....	9 15 6	.....
2	Jute, raw	200	1,060	425	.....	.....	2 9 6	.....
24	Lime and limestones	12,545	1,731	22,550	.....	.....	365 8 0	.....
23	Linseed	3,050	11,787	6,275	.....	.....	61 8 0	.....
44	Mustard	8,500	34,000	17,715	.....	.....	128 8 9	.....
60	Miscellaneous	3,545	8,753	15,045	.....	.....	128 15 6	.....
4	Oil	600	3,400	1,275	.....	.....	10 13 0	.....
1	Other oil-seeds	150	450	275	.....	.....	4 2 0	.....
1	Other fibres manufactured	200	2,600	525	.....	.....	7 14 0	.....
11	Oil-cake	1,585	1,585	3,730	.....	.....	32 3 0	.....
808	Passenger-boats	.....	49,610	.....	.....	.....	390 1 9	.....
35	Paddy	4,895	5,714	8,040	.....	.....	39 7 3	.....
69	Rice	8,852	22,517	18,265	.....	.....	105 0 6	.....
6	Silk, raw	135	41,500	1,635	.....	.....	9 0 9	.....
73	Salt	23,702	94,468	44,350	.....	.....	375 6 3	.....
65	Straw (1,514 kahuns)	16,307	5,674	35,666	.....	.....	176 4 0	.....
10	Sand	3,625	477	6,170	.....	.....	28 13 3	.....
3	Stone-plates	550	550	1,050	.....	.....	15 12 6	.....
42	Sugar, unrefined	5,400	22,330	12,235	.....	.....	89 5 9	.....
2	Spices	200	2,000	500	.....	.....	6 6 6	.....
7	Timbers (12 in number)	450	867	829	.....	.....	8 9 6	.....
46	Tobacco	5,155	35,930	15,130	.....	.....	128 8 6	.....
306	Vegetable and other kinds of provisions	20,289	35,827	44,070	.....	.....	198 9 6	.....
3	Wheat	270	1,180	700	.....	.....	8 12 0	.....
3,014	Total	1,66,723	8,40,400	5,06,815	18,101	2,31,038	8,801 8 9	0 3
3,611	Total of same month last year	1,38,586	8,60,681	4,62,160	16,148	2,19,820	8,935 14 9	0 2 5

MISCELLANEOUS.

18	Passengers (8,569 in number)	.....	.....	.....	.....	.....	141 5 3	.....
18	Boats passed free	.....	.....	.....	.....	.....	22 3 9	.....
18	Demurrage, &c.	.....	.....	.....	.....	.....	163 0 0	.....
18	Total	.....	.....	.....	.....	.....	163 0 0	.....
18	Total of same month last year	.....	.....	.....	.....	.....	163 0 0	.....

The Canal Ranges IV and V from Midnapore to Panchkorah West, was closed from 1st to 30th April 1880 for silt clearance.

Midnapore Canal—continued.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

No.	Cargo	Mds.	Rs.			Rs. A. P.	A. P.
				Mds.	Rs.		
3	Coal	1,500	529	2,675	.....	29 11 6	.....
3	Total	1,500	529	2,675	95	2,014	29 11 6
1	Total of same month last year	525	163	975	35	278	3 10 6

ABSTRACT.

No.	Cargo	Mds.	Rs.	Mds.	Rs.	Mds.	Rs.	A. P.
3,032	Private, including miscellaneous	1,65,723	8,49,460	5,06,815	18,101	231,038	3,965 1 9	.....
3	Government stores, including miscellaneous	1,500	529	2,675	95	2,914	29 11 6	.....
3,035	Grand Total	1,67,223	8,49,929	5,09,390	18,196	233,052	3,964 13 3	.....
3,025	Grand total of same month last year	1,30,111	8,60,844	4,53,135	16,183	220,598	3,693 2 6	.....

MEMO.

Rs. A. P.

Unrecovered balance on the 1st of the month	725 5 9
Amount of tollage for the month	3,964 13 3
Total	4,720 3 0
Amount credited in the accounts for the month	4,142 2 0
Balance at the end of the month	578 1 0

Hidgellee Tidal Canal.

LENGTH OF CANAL OPEN—29 MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

No.	Cargo	Mds.	Rs.			Rs. A. P.		
				Mds.	Rs.			
4	Betel-nut	260	2,200	1,200	.....	15 15 0	
19	Bamboos (1,575 in number)	450	331	4,295	.....	60 5 3	
16	Coal	4,225	2,427	8,800	.....	104 6 0	
1	Cotton, raw	21	450	225	.....	4 1 3	
2	Cocoanut (3,400 in number)	.....	98	400	.....	3 14 0
1	Copper plate	10	400	225	.....	4 1 3	
2	Cotton twist and yarn (European)	26	600	675	.....	12 3 9	
616	Empty boats	.....	.....	76,350	.....	1,041 15 9
6	Earthenware	220	114	940	.....	9 2 3	
1	Firewood	200	60	425	.....	6 12 6	
4	Hemp	400	1,600	1,300	.....	8 15 0	
3	Hentalwood	550	360	1,700	.....	29 2 6	
2	Jute	50	200	140	.....	0 15 3*	
3	Lime	350	340	800	.....	6 9 6	
10	Limestone	2,235	919	4,040	.....	27 12 3	
151	Miscellaneous	8,004	60,150	35,950	.....	533 8 3	
14	Mat	1,326	6,600	5,180	.....	35 9 9	
6	Mustard	162	651	945	.....	9 5 6	
1	Oil-cake	32	32	125	.....	0 13 9	
571	Paddy	1,19,370	1,20,912	2,29,310	.....	3,764 0 6	
4	Planks (165 in number)	180	284	650	.....	11 12 6	
1	Potato	39	78	60	.....	1 1 3	
23	Passenger boat	.....	.....	1,115	.....	10 9 3
49	Rice	8,357	16,432	15,925	.....	122 2 0	
38	Salt	7,934	31,058	19,765	.....	291 3 3	
2	Skin (650 pieces)	5	1,225	250	.....	2 13 6	
37	Straw (440 kahuns)	6,280	872	12,275	.....	84 6 3	
2	Sagoon fibs (238 in number)	85	316	350	.....	6 5 6	
1	Soorkee	50	18	275	.....	4 15 9	
1	Sand	125	.....	275	.....	1 14 3
5	Sugar, unrefined	362	804	2,325	.....	40 2 3	
2	Sugar, refined	28	133	145	.....	2 6 6	
3	Timber (5 in number)	40	115	120	.....	1 15 3	
6	Tobacco	78	824	1,365	.....	18 5 3	
35	Tamarind	1,614	1,614	6,925	.....	98 11 9	
1	Vegetable	15	16	40	.....	0 4 3	
1,043	Total	1,63,977	2,52,323	4,35,895	15,568	3,64,218	6,365 10 0	3 3 pies.
1,944	Total of same month last year	1,50,280	3,14,804	4,34,940	15,534	3,53,107	6,209 2 0	3 3 pie.
	MISCELLANEOUS.							
	Passenger (110 in number)	10 3
	Demurrage &c.	7 13 6
	2 Bafis of 162 bamboos	8	0 6 6
	1 ditto of 6 timber	0 13 0
	Total	8	11 10 3
	Total of same month last year	85 13 6

* Canal re-opened on the 8th April 1880.

Hiddelee Tidal Canal—continued.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			
ABSTRACT.								
1,643	Private, including miscellaneous	1,63,077	2,52,331	4,35,895	15,568	3,64,218	6,377 4 3	.....
.....	Government stores, including miscellaneous	.....	.....	.....	.....	.....	.....	.....
1,643	Grand Total	1,63,077	2,52,331	4,35,895	15,568	3,64,218	6,377 4 3	.....
1,944	Grand total of same month last year	1,59,280	3,14,804	4,34,940	15,534	3,53,107	6,294 15 6	.....

MEMO.

Rs. A. P.

Unrecovered balance on the 1st of the month	.....	.....	.....	.....	0 5 0
Amount of tollage for the month	.....	.....	.....	.....	6,377 4 3
Total	.....	.....	.....	.....	6,377 9 3
Amount credited in the accounts for the month	.....	.....	.....	.....	4,235 8 3
Balance at the end of the month	.....	.....	.....	.....	2,142 1 0

SONE CIRCLE.

Arrah Canal.

LENGTH OF CANAL OPEN—65 MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

		Mds.	Rs.				Rs. A. P.	A. P.
4	Rice	1,066	2,955	1,466	52	1,962	22 14 9	.....
14	Salt	2,800	12,600	4,273	152	6,494	71 7 3	.....
22	Other articles of food	2,513	5,026	3,810	136	3,751	48 15 3	.....
11	Linseed	5,428	21,712	6,529	233	9,799	100 6 3	.....
1	Stone	60	10	115	4	144	0 11 0	.....
3	Soorkey	829	50	1,218	43	1,596	4 15 0	.....
1*	Lime	210	1,050	360	12	741	7 19 6	.....
3	Coal	1,750	875	2,159	77	3,000	16 10 6	.....
11	Luzzages	1,236	326	2,346	83	4,150	32 5 9	.....
2	Poppy leaves	638	300	889	31	682	7 1 9	.....
51	Empty	.....	.....	2,779	99	1,537	20 7 3	.....
6	Passengers	.....	.....	266	9	250	4 2 0	.....
	Short charge of toll	.....	.....	.....	.....	.....	1 10 3	.....
129	Total	16,530	44,904	25,210	931	34,106	339 5 0	0 1 0
159	Total of same month last year	24,070	69,815	41,496	1,474	62,612	256 12 6	0 1 7
MISCELLANEOUS.								
71	Rafts of bamboos and bullahs (1,279,776 in number).	.....	.....	.....	.....	.....	173 5 3	.....
	Total	.....	.....	.....	.....	.....	173 6 3	.....
	Total of same month last year	.....	.....	.....	.....	.....	264 13 9	.....

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

		Mds.	Rs.				Rs. A. P.	A. P.
1	House fittings	375	1,300	584	28	1,146	12 9 3	.....
10	Stones	2,428	400	3,405	121	2,546	14 8 6	.....
1	Wooden-gates	175	1,200	309	10	140	2 7 0	.....
3	Iron	590	1,475	915	32	1,690	37 12 3	.....
1	Barrels of cement	56	108	119	4	169	1 9 0	.....
2	Bricks	336	18	634	22	650	3 9 0	.....
6	Empty	.....	.....	1,134	40	9,032	8 15 6	.....
24	Total	3,954	4,501	7,091	249	15,168	61 6 6	0 0 7
34	Total of same month last year	5,093	304,671	9,708	335	12,213	90 14 6	0 1 5
MISCELLANEOUS.								
2	Rafts of bamboos and bullahs (248 in number).	.....	.....	.....	.....	.....	56 5 3	.....
	Total	.....	.....	.....	.....	.....	56 5 3	.....
	Total of same month last year	.....	.....	.....	.....	.....	.....	.....

ABSTRACT.

		Mds.	Rs.				Rs. A. P.	A. P.
129	Private, including miscellaneous	16,530	44,904	25,210	931	34,106	512 10 3	.....
24	Government stores, including miscellaneous	3,954	4,501	7,091	249	15,168	57 11 9	.....
153	Grand Total	20,484	49,405	33,301	1,180	40,274	610 6 0	.....
153	Grand total of same month last year	29,163	374,486	51,204	1,809	74,225	921 8 9	.....

MEMO.

Rs. A. P.

Unrecovered balance on the 1st of the month excess	.....	.....	.....	136 2 4
Amount of tollage for the month	.....	.....	.....	610 6 0
Total	.....	.....	.....	473 14 8
Amount credited in the accounts for the month	.....	.....	.....	899 13 0
Balance at the end of the month, excess	.....	.....	.....	423 14 4

Canal closed on the 17th April, so these receipts really represent only little more than half month.

Western Main Canal.

LENGTH OF CANAL OPEN—22 MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			
12	Linseed	5,300	21,200	6,950	248	6,448	97 1 6	....
1	Cattle skins	200	1,000	375	13	338	5 6 3	....
1	Gairoo	200	100	325	11	286	4 10 9	....
8	Empty boats	.....	.....	900	32	704	3 11 6	....
	Total	.....	.....	.....	.....	.....	116 14 0	....
	Deduct mistake in the toll and traffic statement for December 1878 on account of excess charge made in item passenger-boats by the toll collector.	.....	.....	.....	.....	.....	1 0 0	....
22	Total	5,700	22,400	8,550	304	7,776	109 14 0	0 27
24	Total of same month last year	6,700	25,650	9,400	335	8,054	105 6 9	0 25

Canal closed from 15th April 1880.

Toll collected up to 15th idem.

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

		Mds.	Rs.				Rs. A. P.	A. P.
2	Doors	600	55	950	34	476	7 11 6	....
5	Empty boats	.....	.....	650	23	124	2 10 9	....
7	Total	600	55	1,600	57	600	10 5 6	0 33
15	Total of same month last year	500	357	1,725	61	791	10 3 6	0 24

ABSTRACT.

		Mds.	Rs.				Rs. A. P.	A. P.
22	Private, including miscellaneous	5,700	22,400	8,550	304	7,776	109 14 0	....
7	Government stores, including miscellaneous	600	55	1,600	57	600	10 5 6	....
29	Grand Total	6,300	22,455	10,150	361	8,376	120 3 6	....
39	Grand total of same month last year	7,200	26,067	11,125	396	8,845	115 10 3	....

MEMO.

Unrecovered balance on the 1st of the month 190 5 6

Amount of tollage for the month 120 3 6

Total 310 9 0

Amount credited in the accounts for the month 310 9 0

Balance at the end of the month

Patna Canal.

LENGTH OF CANAL OPEN—86½ MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

5	Rice	1,000	2,500	1,771	63	3,564	46 14 3	....
1	Wheat	300	725	471	17	1,415	14 1 0	....
2	Pulses	330	380	470	17	1,179	12 1 3	....
6	Salt	1,025	2,855	1,857	66	5,148	51 12 3	....
16	Other food	1,905	5,540	3,441	123	7,624	75 18 0	....
4	Til	1,050	2,700	1,635	58	3,535	36 8 9	....
28	Linseed	7,900	22,700	12,562	438	33,076	239 8 0	....
1	Other seeds	10	33	19	1	10	0 1 3	....
50	Stimulant	3,424	14,570	13,208	471	35,068	368 4 9	....
6	Clothing	700	8,300	1,331	48	1,971	20 5 9	....
14	Building materials	2,635	337	6,068	214	4,654	42 12 9	....
63	Miscellaneous	7,179	61,550	14,925	529	35,579	359 8 0	....
158	Empty boats	.....	.....	16,020	570	17,280	98 7 9	....
11	Iron rails	.....	.....	4,780	171	13,214	145 5 0	....
3	Stores for Dehree Workshop	.....	.....	1,133	40	3,135	32 5 0	....
368	Total	27,458	1,22,207	79,631	2,826	166,992	1,642 10 9	0 18
284	Total of same month last year	30,756	1,12,686	55,802	1,984	130,975	1,108 11 0	0 17

MISCELLANEOUS.

Bamboos and bullahs (2,751,123 in number)	20,000	.....	.....	.....	1,292 10 3	....
Passengers (43 in number)	.....	.....	.....	.....	17 5 3	....
Demurrage	.....	.....	.....	.....	1 4 0	....
Total	20,000	.....	.....	.....	1,311 3 6	....
Total of same month last year	20,341	.....	.....	.....	1,248 13 9	....

Patna Canal—continued.

Number of Boats.	Nature of cargo.	APPROXIMATE		TONNAGE OF BOATS.		Ton mileage.	Tollage.	Rate of toll per ton mile.
		Weight of cargo.	Value of cargo.	Mds.	Tons.			
3	Rubble	1,274	.....	1,124	40	990	8 9 0	.....
5	Mile stone	1,167	.....	872	31	1,116	7 11 6	.....
3	Coal	802	401	1,175	41	2,410	12 6 6	.....
2	Empty barges	.....	.....	225	8	406	7 11 6	.....
13	Empty boats	.....	.....	1,244	44	925	4 12 3	.....
26	Total	3,243	401	4,640	164	5,947	41 2 9	0 1 3
17	Total of same month last year	1,412	443	4,353	154	8,864	66 9 4	0 1 4
	MISCELLANEOUS.							
5	Steamers-passed free	.....	.....	.....	.....	.....	.....	.....
1	Passenger boat passed free	.....	.....	.....	.....	.....	.....	.....
6	Total	.....	.....	.....	.....	.....	.....	.....
12	Total of same month last year	.....	.....	.....	.....	.....	.....	.....

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

			Rs.				Rs. A. P.	A. P.
3	Rubble	1,274	.....	1,124	40	990	8 9 0	.....
5	Mile stone	1,167	.....	872	31	1,116	7 11 6	.....
3	Coal	802	401	1,175	41	2,410	12 6 6	.....
2	Empty barges	.....	.....	225	8	406	7 11 6	.....
13	Empty boats	.....	.....	1,244	44	925	4 12 3	.....
26	Total	3,243	401	4,640	164	5,947	41 2 9	0 1 3
17	Total of same month last year	1,412	443	4,353	154	8,864	66 9 4	0 1 4
	MISCELLANEOUS.							
5	Steamers-passed free	.....	.....	.....	.....	.....	.....	.....
1	Passenger boat passed free	.....	.....	.....	.....	.....	.....	.....
6	Total	.....	.....	.....	.....	.....	.....	.....
12	Total of same month last year	.....	.....	.....	.....	.....	.....	.....

ABSTRACT.

368	Private, including miscellaneous	27,458	1,51,967	79,631	2,826	166,992	2,953 14 3	.....
32	Government stores, including miscellaneous	3,243	401	4,640	164	5,947	41 2 9	.....
400	Grand Total	30,701	1,51,968	84,271	2,990	172,939	2,995 1 0	.....
313	Grand total of same month last year	32,168	1,26,470	60,155	2,138	139,839	2,484 2 1	.....

MEMO.

		Rs. A. P.
Unrecovered balance on the 1st of the month	...	361 4 9
Amount of tollage for the month	...	2,995 1 0
	Total	3,296 5 9
Amount credited in the accounts for the month	...	2,344 8 6
Balance at the end of the month	...	951 13 3

ABSTRACT.

CANALS.	TOLLAGE OF THE YEAR 1880-81.		TOLLAGE OF THE YEAR 1879-80.		REMARKS.
	During the month.	To end of month.	During the corresponding month.	To end of cor- responding month.	
ORISSA CIRCLE.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
Kendrapara	4,931 1 10	4,931 1 10	5,914 8 4	5,914 8 4	
High Level, Range I	609 13 0	609 13 0	1,490 15 6	1,490 15 6	
Taldunda	242 0 3	242 0 3	235 1 6	235 1 6	
High Level, Range II	781 5 9	781 5 9	1,502 10 0	1,502 10 0	
Ditto, do. III	62 5 7	62 5 7	253 15 6	253 15 6	
Total Orissa Circle	6,626 10 5	6,626 10 5	9,397 2 10	9,397 2 10	
SOUTH-WESTERN CIRCLE.					
Midnapore	3,994 13 3	3,994 13 3	3,093 2 6	3,093 2 6	
Hidgeles Tidal	6,377 4 3	6,377 4 3	6,294 15 6	6,294 15 6	
Total South-Western Circle	10,372 1 6	10,372 1 6	9,388 2 0	9,388 2 0	
SONE CIRCLE.					
Arrah	610 6 0	610 6 0	921 8 9	921 8 9	
Main Western	120 3 6	120 3 6	115 10 3	115 10 3	
Patna	2,995 1 0	2,995 1 0	2,484 2 1	2,484 2 1	
Total Sone Circle	3,725 10 6	3,725 10 6	3,521 5 1	3,521 5 1	
GRAND TOTAL	20,724 6 5	20,724 6 5	22,396 9 11	22,396 9 11	

GOVERNMENT TRANSPORT SERVICE.

	Passengers.			Total receipts.			Passengers.			Total receipts.			Passengers.			Total receipts.		
	No.	Mds.	Rs. A. P.	No.	Mds.	Rs. A. P.	No.	Mds.	Rs. A. P.	No.	Mds.	Rs. A. P.	No.	Mds.	Rs. A. P.			
ORISSA CIRCLE.																		
High Level Canal ...	136	11	50 12 6	136	11	50 12 6	141	447	139 14 6	141	447	139 14 6						
Total Orissa Circle ...	136	11	50 12 6	136	11	50 12 6	141	447	139 14 6	141	447	139 14 6						
SOUTH-WESTERN CIRCLE.																		
Midnapore ...	1,205	123	440 4 0	1,205	123	440 4 0	967	240	352 5 6	967	240	352 5 6						
Total South-Western Circle ...	1,205	123	440 4 0	1,205	123	440 4 0	967	240	352 5 6	967	240	352 5 6						
SONE CIRCLE.																		
Arrah	1,262	2,975	1,113 5 6	1,262	2,975	1,113 5 6	610	34	653 0 0	610	34	653 0 0						
Patna	797	143	481 1 3	797	143	481 1 3	610	34	653 0 0	610	34	653 0 0						
Total Sone Circle ...	2,059	3,118	1,594 6 9	2,059	3,118	1,594 6 9	610	34	653 0 0	610	34	653 0 0						
GRAND TOTAL ...	3,400	3,252	2,085 7 3	3,400	3,252	2,085 7 3	1,718	721	1,145 4 0	1,718	721	1,145 4 0						

TOTAL NAVIGATION RECEIPTS.

Orissa Canals ...	...	...	...	6,677	6 11	6,677	6 11	9,537	1 4	9,537	1 4					
Midnapore ...	...	...	...	10,812	5 6	10,812	5 6	9,740	7 6	9,740	7 6					
Sone ...	...	...	...	5,320	1 3	5,320	1 3	4,174	5 1	4,174	5 1					
GRAND TOTAL ...				22,809	13 8	22,809	13 8	23,451	13 11	23,451	13 11						

C. TAYLOR,

Asst. Secy. to the Government of Bengal,

P. W. Dept., Irrigation Branch.

The 24th June 1880.

Weekly Return of Traffic Receipts on Indian Railways.

EAST INDIAN RAILWAY.

Approximate Return of Traffic for week ended 19th June 1880 on 1,507½ miles open.

	COACHING TRAFFIC.			MERCHANTISE AND MINERAL TRAFFIC.			TOTAL TRAFFIC RECEIPTS.	TRAIN MILES RUN.		
	No. of passengers.	Coaching receipts.	Weight carried.	Receipts.				Coaching.	Merchandise.	Total.
Total traffic for the week ...	151,706	Rs. A. P. 1,71,477 3 0	£ s. d. 15,718 14 10	Mds. s. 12,21,314 10	Rs. A. P. 4,98,409 12 9	£ s. d. 45,687 11 3	Rs. A. P. 6,69,886 15 9	43,957	95,312	139,269
Or per mile of railway ...	.....	113 12 3	10 8 7	.....	330 10 10	30 6 3	444 7 1	.....	.....	.....
For previous 22 weeks of half-year ...	3,704,923	52,65,396 15 0	482,661 7 9	3,37,55,176 10	1,41,93,987 13 9	1,301,115 11 1	1,94,59,334 12 9	1,117,262	2,574,859	3,692,122
Total for 23 weeks ...	3,946,680	54,36,874 2 0	498,380 2 7	3,49,76,400 20	1,46,93,997 10 6	1,346,803 2 4	2,01,20,271 12 6	1,161,219	2,670,171	3,831,391
COMPARISON.										
Total for corresponding week of previous year ...	146,463	1,65,745 3 6	15,103 6 4	13,60,232 0	5,70,068 0 9	52,256 4 8	7,35,813 4 3	51,808	104,126	155,734
Per mile of railway, corresponding week of previous year ...	.....	109 15 6	10 1 7	.....	378 3 5	34 13 5	488 2 11	.....	.....	.....
Total to corresponding date of previous year ...	3,972,429	55,79,256 15 9	511,431 17 9	3,84,56,888 20	1,61,16,577 2 6	1,477,352 18 1	2,16,95,834 1 3	1,202,960	3,043,619	4,336,588

BENGAL PROVINCIAL RAILWAYS.

Weekly Statement of Traffic Receipts.

No. 19.

	Name of Railway.	Length open.	RECEIPTS FOR WEEK ENDING		TOTAL RECEIPTS FROM 1ST JANUARY		Total increase in 1880.	Total decrease in 1880.
			17th May 1879.	15th May 1880.	To 17th May 1879.	To 15th May 1880.		
1880.		Miles.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		
22nd May ...	Northern Bengal ...	230	20,725 0 0	28,497 0 0	4,26,741 0 0	5,55,867 0 0	1,29,126 0 0	.....
23rd do. ...	Tirhoot ...	82	9,667 0 0	10,337 0 0	1,92,057 0 0	2,10,237 0 0	18,200 0 0	.....
13th do. ...	Patna and Gya ...	67	2,083 0 0	7,535 0 0	9,289 0 0	1,80,364 0 0	1,71,017 0 0	.....
5th June ...	Calcutta and South-Eastern ...	28	2,191 0 0	2,231 0 0	53,598 0 0	50,268 0 0	.....	3,880 0 0
13th May ...	Nalhati ...	27½	1,793 0 0	1,401 0 0	35,243 0 0	30,495 0 0	4,748 0 0
	Total ...	424½	36,459 0 0	50,051 0 0	7,16,928 0 0	10,27,193 0 0	3,18,343 0 0	8,078 0 0

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